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Artist info

Aldo Vicente

3DArtistonline

Username: AldoVicenteCG

Personal portfolio site
AldoVicenteCG.Wordpress.com

Country USA

Software used
Maya, mental ray, Photoshop

There are few 3D tools as prominent as Maya, so we turned to it this issue for Aldo's in-depth vehicle tutorial, starting on p48. Elsewhere we explore time with Mr Peabody and Sherman (p26) harness the power of MODO (p64) and consider the benefits of 3D using Macs (p34).

> "If you want to learn the process of modelling a complete car in Maya, building realistic materials and lighting, then rendering out passes to composite and enhance a final image, you're in the right place"

Aldo Vicente on the Maya vehicle pipeline **Page 48**

With the Disc

Tutorial files:
- Extra_001_FullModel
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Welcome

to the magazine and 116 pages of amazing 3D

Hello and welcome to 3D Artist magazine! There's no getting away from the fact that Maya is an industry-standard tool. As such, this issue we take a closer look at its vehicle pipeline with artist Aldo Vicente, starting on p48.

We also got in touch with the guys at 3DPRINTUK to find out just how practical 3D printing is in the home (p42) and spoke to Framestore about the new RoboCop reboot (p104). From still life to sci-fi, there's plenty to get stuck into this issue!

Chris Deputy Editor

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3. **A CD packed full of creative goodness**
4. Interviews with inspirational artists
5. **Tips for studying 3D or getting work in the industry**
6. The chance to see your art in the mag!

This issue's team of expert artists...

Aldo Vicente

Aldo's an expert when it comes to Maya photorealism, as his '67 Shelby Cobra tutorial on page 48 shows!

Sofian Moumene

Traditional art meets digital on page 56, with Sofian exploring the use of 3ds Max to create still-life imagery

Tor Frick

Machinegames technical art director Tor showcases how MODO can achieve your sci-fi visions

Etienne Jabbour

Etienne of Slide reveals how Marmoset Toolbag 2.0 can be used to create lifelike characters in real-time

Rainer Duda

This issue Houdini expert Rainer takes a look at destruction in the software's latest release (p76)

Gustavo Åhlén

Gustavo launches into CINEMA 4D this issue, revealing some tips for quick and easy arch-vis work using NURBS

Michael Levine

As character simulation TD at Digital Domain, Michael knows a thing or two when it comes to Maya hair simulation

Eugenio García Villarreal

Eugenio discusses how LightWave can be a quick and powerful tool for concepting scenes during production

Jonathan Williamson

The Blender Cookie team know Blender through and through. This issue, Jonathan explores uses of Cycles

Jonatan Catalan Navarrete

Maxwell Render V3 is out now! Experienced user Jonatan takes a look at the new improvements on p94

Patrick Goski

Patrick explores the various enhancements and additions to CINEMA 4D plug-in X-Particles 2.5

Fred Standeven

The team at 3DPPRINTUK explore the benefits of 3D printing in the home. See the results on p42

Sign up, share your art and chat to other artists at www.3dartistonline.com

3DArtist

Imagine Publishing Ltd
Richmond House, 33 Richmond Hill
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Web: www.imagine-publishing.co.uk
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Magazine team

Deputy Editor Chris McMahon
chris.mcmahon@imagine-publishing.co.uk
☏ 01202 586239
Editor in Chief Dan Hutchinson
Staff Writer Larissa Mori
Sub Editor Tim Williamson
Senior Designer Chris Christoforidis
Photographer James Sheppard
Senior Art Editor Duncan Crook
Head of Publishing Aaron Asadi
Head of Design Ross Andrews

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Contributors
Gustavo Åhlén, Orestis Bastounis, Rainer Duda, Tor Frick, Eugenio García Villarreal, Patrick Goski, Etienne Jabbour, Michael Levine, Sofian Moumene, Jonatan Catalan Navarrete, Fred Standeven, Aldo Vicente, Jonathan Williamson.

Advertising
Digital or printed media packs are available on request.
Advertising Director Matthew Balch ☏ 01202 586437
matthew.balch@imagine-publishing.co.uk
Head of Sales Hang Deretz ☏ 01202 586442
hang.deretz@imagine-publishing.co.uk
Advertising Manager Alex Carnegie ☏ 01202 586430
alex.carnegie@imagine-publishing.co.uk
Account Manager Ryan Ward ☏ 01202 586415
ryan.ward@imagine-publishing.co.uk

Cover disc
Junior Web Designer Steven Usher
3daxtrahelp@imagine-publishing.co.uk

International
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Head of International Licensing Cathy Blackman
☏ +44 (0) 1202 586401
licensing@imagine-publishing.co.uk

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Head of Subscriptions Gill Lambert
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Circulation
Head of Circulation Darren Pearce ☏ 01202 586200

Production
Production Director Jane Hawkins ☏ 01202 586200

Founders
Group Managing Director Damian Butt
Group Finance & Commercial Director Steven Boyd

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Apple & the 3D pipeline

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Orestis Bastounis investigates what Apple can offer 3D artists

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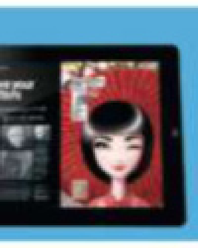

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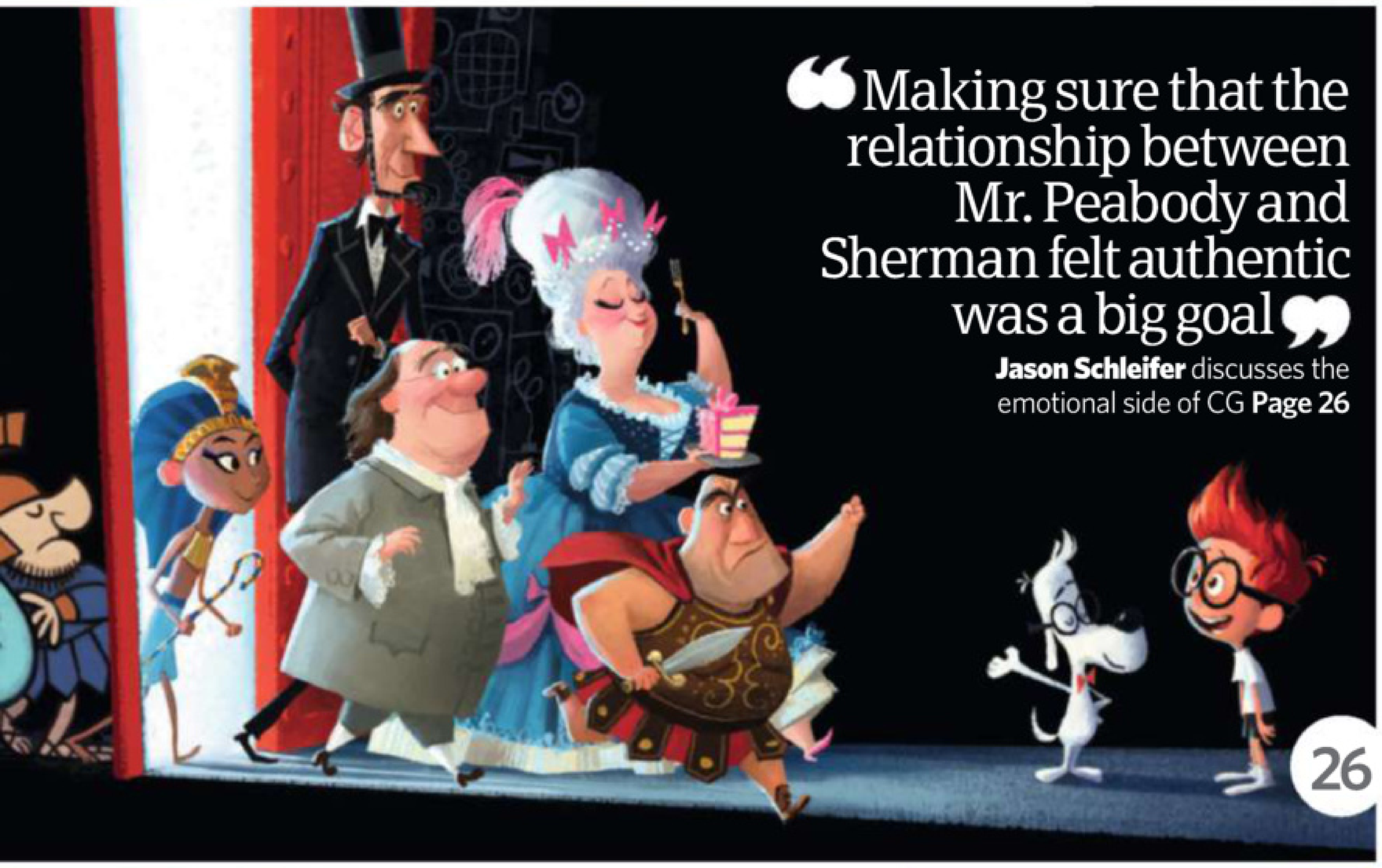

> Making sure that the relationship between Mr. Peabody and Sherman felt authentic was a big goal

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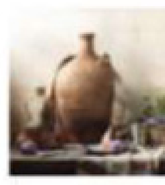

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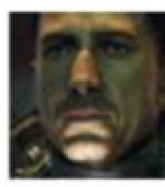

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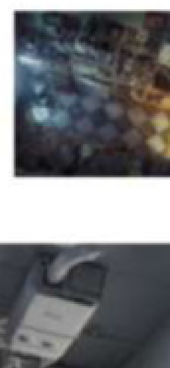

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WELCOME TO

THE GALLERY

Seven pages of great artwork from the 3D community

Images we love!

Jose Lazaro

3DArtistonline

Username: Mr Lazaro

Personal portfolio site
www.josemlazaro.com

Country Spain

Software used 3ds Max, ZBrush, Fusion

Work in progress...

"I love How to Train Your Dragon, so I made my own viking and dragon version, trying to keep the charisma and beauty from the film. I followed the 2D concepts from the art book instead of the 3D characters from the film"

Jose Lazaro, *Northern Viking With His Loyal Friend Ruffus*, 2013

"What a vibrant and eye-catching image to start the mag with. This is truly top class work"

Chris Deputy Editor

Have an image you feel passionate about? Get your artwork featured in these pages

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Artist info

Tamas Medve

3DArtistonline

Username: m3dve

Personal portfolio site
www.m3dve.cgsociety.org

Country Norway

Software used 3ds Max, Photoshop

Work in progress...

"The apocalyptic sci-fi setting in this image is accentuated by the brilliant use of lighting and scale. It conveys just how enormous the container city is"

Larissa Staff Writer

"The image was made for the 2013 Evermotion Challenge, but the main concept for it hatched in my head earlier. I pass by containers every day on my way to work and this gave me the idea of a futuristic city built entirely out of them. I enjoyed working on this image and will surely go on to make more"

Tamas Medve, *Metallum City – Giants in the Dust*, 2013

“We love the way Wojciech combined inspiration from Greek mythology with futuristic character design to create this strong, vibrant portrait of Enyo, an ancient goddess of war”

Larissa Staff Writer

Artist info

Wojciech Magierski

Wojciech is an illustrator, digital artist and a graduate of Cracow Academy in Poland

Personal portfolio site
www.magierski.pl

Country Poland

Software used MODO, ZBrush, Photoshop

Work in progress...

“This image was created for the Slashthree Artpack WAR. I decided to create Enyo, as in mythology she was a daughter of Ares, the god of war. This is a future vision of her”

Wojciech Magierski, *Enyo,* 2013

storemags.com

“Gauthier is a happy man. He dreams about working in one of the most respected restaurants in Europe. However, he knows that everyone who wants to reach the top has to start from the bottom. Because of this, he tries to do his current job as perfectly as possible”

Zeno Pelgrims, *Gauthier The Happy Chef*, 2013

“Like Gauthier, Zeno too seems to be putting in the utmost effort right at the start of his career!”

Chris Deputy Editor

Artist info

Zeno Pelgrims

3DArtist online

Username: Zeno Pelgrims

Personal portfolio site
www.graffik.be

Country UK

Software used Maya, ZBrush, MARI, V-Ray

Work in progress...

Artist info

Sergio Acevedo Ruiz

3DArtist online

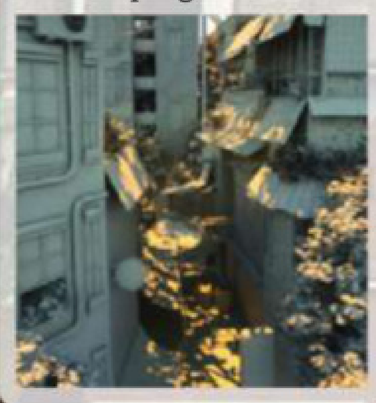
Username: Seehr

Personal portfolio site
www.seehr.es

Country Spain

Software used Maya, Photoshop

Work in progress...



"The use of focus and the lighting work in this piece really adds to the absorbing atmosphere. We think it would be an absolutely stunning backdrop to an animated piece"

Larissa Staff Writer

"Every time I finish a personal work I start a new one as fast as I can. I get inspiration from other works or media content. Next comes the research and investigation and finally, the work. I never stop learning and practising"

Sergio Acevedo Ruiz, *Life Finds a Way*, 2013

> We love that this image tells a story with no words. You can guess the personality of each character without needing to hear them speak
>
> **Chris** Deputy Editor

> I wanted to create an illustration that combined western adventure with black humour. It was inspired by the many Wild West movies I have watched. I set my story in a wild valley, which I hope adds some mystery
>
> **Qinchuan Luo,**
> *Footprint*, 2013

Artist info

Qinchuan Luo

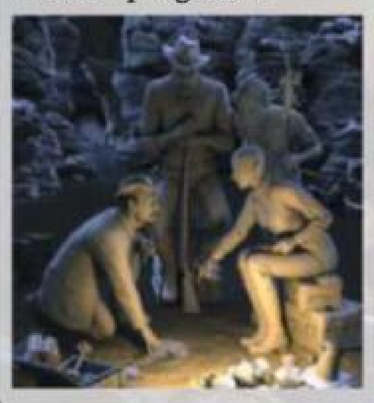
Qinchuan works as a product manager for a mobile software development team

Personal portfolio site
www.weibo.com/u/2947521072

Country China

Software used ZBrush, 3ds Max, Mudbox, V-Ray, UVLayout

Work in progress...



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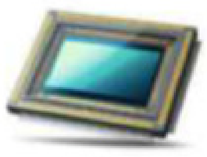

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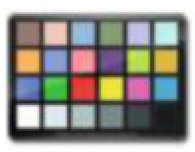

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Though the team settled on the basic gameplay mechanics quickly, work on the look of the game was completely scrapped several times to make sure it would be on-par with the competition

Rags to riches: the BetaDwarf story

How a team of eight students beat all the odds – including illegally living in a University classroom – to start a game-development studio

"I know that Stefan Kabbelgaard, who's the CEO today, has this vision of game-developing being like professional sports – in that there are a lot of people who are dreaming about it, but to live off it you have to truly apply yourself," begins Jesper Kristiansen, sound designer at BetaDwarf, which released its first game, *FORCED*, last October.

Three years before, things weren't looking quite so positive for the indie game-development company as they does today. Denmark was in the middle of the financial crisis, which hit the country's games industry hard. For eight students hoping to become professionals, the outlook was bleak. "You had a couple of studios that were close to becoming triple-A studios and they were shut down, which meant that there were absolutely no jobs to get anywhere," Kristiansen continues. "When starting out, the question was: what is the obvious way to get into the industry? The most obvious way was to make a game!"

BetaDwarf was born, and the small group left their apartments to starting work on what would become *FORCED*, illegally moving into an empty classroom at a university in Denmark – a classroom that would go on to become both their studio and their home.

Centred on the idea of co-op, the game combines arcade and adventure with puzzles and tactical elements, casting players as gladiators condemned to fight against a host of creatures. "We

With *FORCED*, the BetaDwarf team looked to reinvent co-op

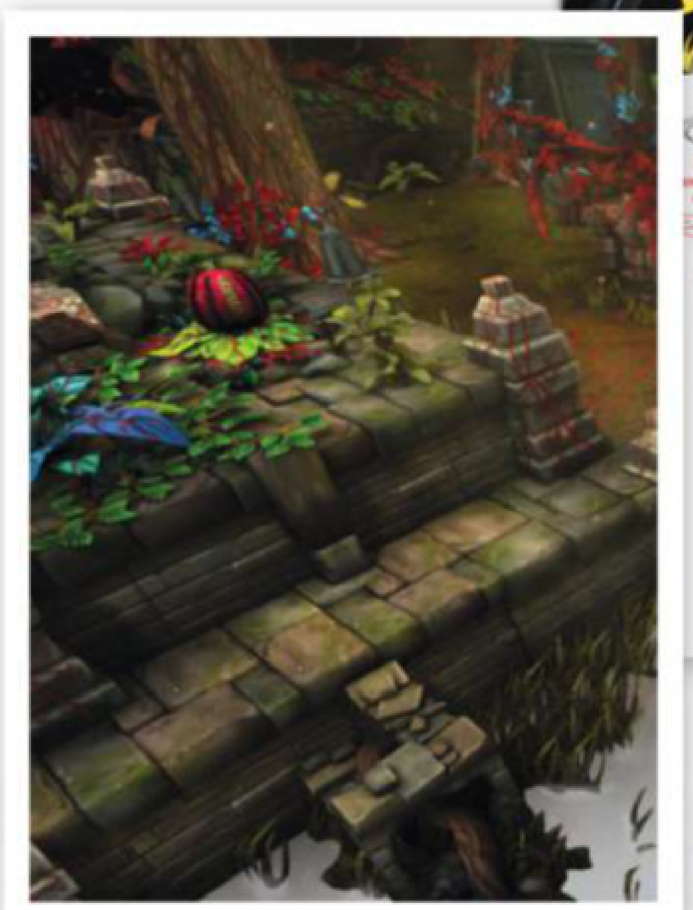
looked at other games that had co-op and found that a lot of them weren't so much about co-operating as they were about you being able to play alongside a friend. That's how we came up with the defining factor for *FORCED*, which is a thing that's called the Spirit Mentor," says Kristiansen. "We call it a reverse football, in that you cannot pass it to others but you can call it to yourself – there's only one of it, so the players have to share."

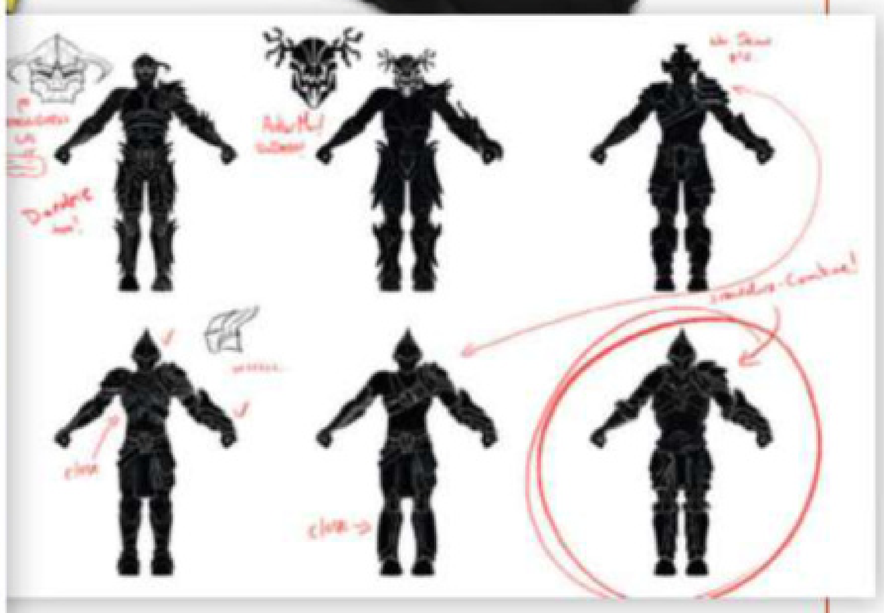
In creating their own game the BetaDwarf team were doing something many only dream about. However, development was not without its challenges. "I'll be honest and say that it was not fun all the time. You're dirt poor, you work all hours and you have to really apply yourself," Kristiansen admits. "Another one of the reasons why it took three years to get the game out was that when we began we were not professionals, so for all of us it's been a learning process." To make matters worse, after seven months the team were discovered in their makeshift university studio and thrown out of the classroom.

"There really weren't any alternatives. By that point, people had already let go of their normal apartments and living in the classroom, so this project had to continue," he remembers. After extensive research into the cheapest place to live in Denmark, the team finally moved into house big enough to fit them. It was after a year there that, running out of money, they finally decided to begin a Kickstarter campaign to help fund the game. After 30 days things were not looking good, but when the team released an image detailing the inspiring story of how they started working on the game, more than a million people saw it. They raised $65,000 dollars, moved into a smaller office in Copenhagen and after another two and a half years, the founders took out a $200,000 loan to give the team four months to find a distribution deal – setting the final deadline to getting the game out after years of ongoing development.

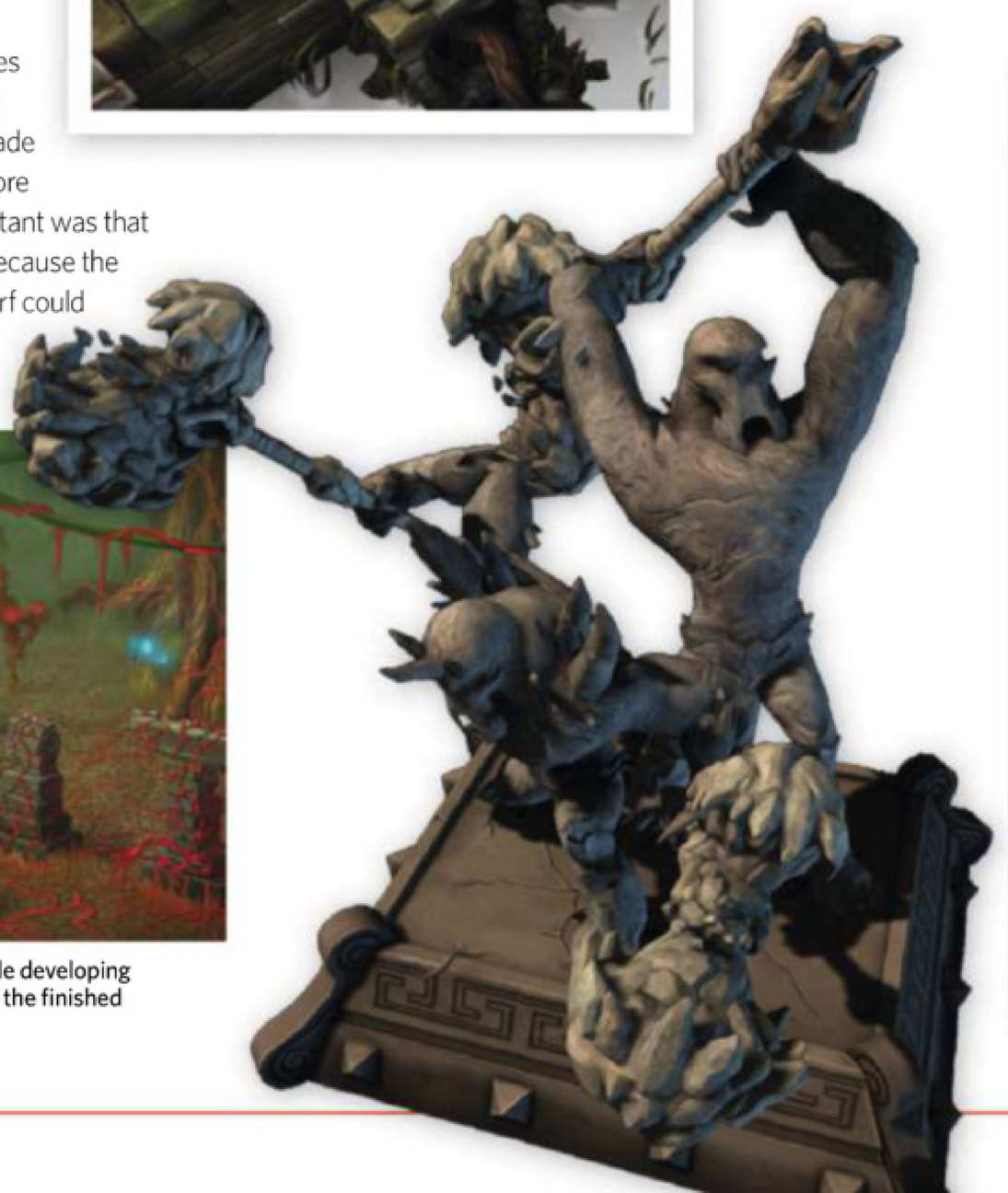
Finally, after three years of work, *FORCED* was released on Steam and the team sold 45,000 copies within the first four days. "It was like Christmas Eve come early. It was our crowning achievement. It made all the things we had gone through in the years before worthwhile," says Kristiansen. "But also very important was that it showed we had a future as a games developer, because the underlying idea was that if this went well, BetaDwarf could continue. Thankfully, working at the office is going to be much more normal now!"

Working on *FORCED* was also a valuable springboard into the industry for many. Five or six previous BetaDwarfs are now in positions with other similar companies





Kristiansen tells us he was the first external person brought into the company as sound designer for the game. He also had a job at Microsoft that he quit after six months to become a full-time games developer



There was not enough cash to be able to pay anybody while developing *FORCED*, aside from the promise of having a percentage in the finished game and the CV experience

Using Unity

Kristiansen explains why the team chose to use the Unity game engine when creating FORCED

"We used the Unity game engine primarily because they're very good at supplying software for education. Unity started in Denmark, so for Danish game education Unity's pretty much the standard, because everybody has experience using it. The other thing is that the engine fits well with the scale of the game – we weren't aiming for a triple-A game, but maybe a double-A one. It had the production values to look really good and we were trying to aim for a pretty mainstream look, but one that was on a par with the competition"

During development, Nooshin even travelled to New Zealand to meet with Weta's co-founder and creative director Richard Taylor, who became a fan of the script and wanted the team to shoot it at his studio

Indie VFX

Tim Smit tells us how he single-handedly created the VFX for indie feature film Last Passenger by director Omid Nooshin

First-time director Omid Nooshin has already received a British Independent Film Awards nomination for his new Indie feature film, *Last Passenger*. The film is a thriller about a small group of passengers on a speeding London commuter train battling their warped driver. What's most impressive about the production of *Last Passenger*, however, is that despite being a feature thriller full of CG fire, explosions and effects shots, all the VFX were actually created by just one artist, Tim Smit, who ventured into the world of visual effects after having graduated as a physicist. Here he reveals how complex the task of creating an entire feature film's VFX can be.

Can you take us through the workflow for the project? What tools, techniques and software did you find most useful during its creation?

The workflow I used on *Last Passenger* basically consisted of rendering the CG train in 3ds Max, using low-quality fume sims to create the fire lighting where needed and comping it together in After Effects. For the more complex sequences, I used RayFire to demolish the model, giving it a realistic and physically accurate exploding animation. A lot of PFlow was used to create fine debris, sparks and embers.

What were the main drawbacks and benefits of working as the only VFX artist on an indie movie?

For starters, it enabled me to oversee everything very clearly. From being on the set as the sole VFX supervisor and artist, to working very closely with the director during post, it gave me a lot of freedom to develop my own workflow and get instant feedback on my work. The challenge was to contain the amount of visual effects shots to a number that I was able to work with: in the end the amount of shots ballooned from 20 to around 106.

Smit would advise other budding VFX artists to follow his lead and take on a one-man project

Would you advise fellow VFX artists to do what you have done with* Last Passenger *and create their own one-man indie projects?

I would strongly advise that any VFX artist should try what I did on *Last Passenger* because seeing a movie get made because you were involved is the most rewarding feeling you can get. You feel fused with the project because not only are you making the movie possible with these effects, you also have a great experience doing so. The software available nowadays is so powerful that it has drastically lowered the threshold for achieving amazing results. I have no doubt that in the future, movies shot using a similar approach to the one we used on *Last Passenger* are going to be a lot more common.

Smit used 3ds Max 2012, Fume FX 2.1, RayFire 1.51 and Adobe After Effects CS5 to create all the VFX in *Last Passenger*

3D design on the road

Animator André Figueiredo discusses creating his next 3D short in streets and museums, all while travelling through Europe

Portuguese couple André Figueiredo and Sara Matos wanted to inform the general public about the in-depth processes behind the dazzling sheen of finished 3D animation. To do so, they chose to take a very unusual path.

"Around four years ago we were visiting Madrid, and we were watching some street artists when we had the idea," begins Matos. Together, she and 3D artist Figueiredo decided to take a tour through Europe, where he would set up his chair, desk and computer in museums, galleries, libraries and even subways. With a projector connected so that anyone passing could see what he was doing in real-time, Figueiredo would then set about modelling, texturing, rigging and animating his latest short animation.

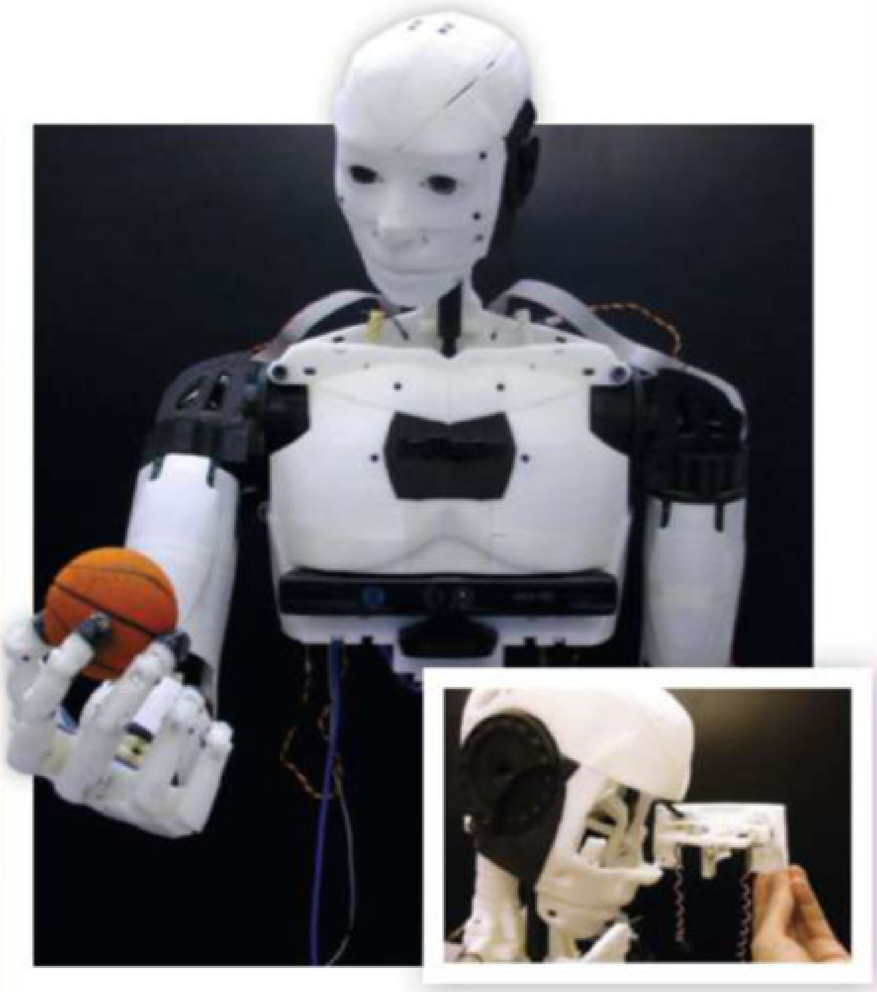
"The short film will be about Mister Manuel, a typical Portuguese man who has a caravan where he sells hotdogs," explains Matos. "He doesn't get much money with his business, so when he sees a contest on television that offers a big prize he decides to transform his caravan into a plane and travel to the city where the contest will take place." She tells us that throughout the tour she and Figueiredo took reference images from each city they visited, with the goal being to incorporate elements from each into the look of the imaginary contest city of the short.

"It worked really well. People get interested and amazed by the process of modelling an object or a character," continues Matos. "We got really surprised by some 10- to 15-year-old children who talked to us in different countries, and had already tried to do something in animation on their own with free software, or on the internet. They got really excited with what we were doing and asked us how they could learn more."

Find out more about the 3D Europe Tour at www.facebook.com/3deuropetour.

The tour travelled around Portugal before going to Barcelona, Helsinki, Prague, Stockholm and back to Portugal to attend Lisbon's Festival IN

André Figueiredo set up his computer, desk and projector in venues all over Europe, displaying his work-in-progress short animation



Print your own robot

Sculptor and designer Gaël Langevin discusses InMoov – the first lifesize, humanoid, 3D-printed robot

It all started after Paris-based sculptor Gaël Langevin first received a job to create a prosthetic hand with his new 3D printer – a machine he had intended to use for his work as a designer. The job was cancelled before it could even begin, but Langevin decided to design the limb anyway – going on to share it with anyone on Thingiverse for free. "Why? The software I was using to create in (Blender) was issued as open-source, so it was a way to give back what was given to me," explains Langevin.

The result was the design for InMoov, a full-size robot that Langevin has been building step by step. Incredibly, anyone with the technology can also 3D-print and animate their own. Langevin carefully designed each part to be able to fit on a build area of 12 x 12 x 12 centimetres – small enough to be reproduced by any home printer. "Today, InMoov has a 4 PID tracking eye system and when he talks his jaw moves at the same time," Langevin continues. The robot can even be controlled using Leap Motion, which lets anyone move InMoov's hand in real-time by moving his or her own hand next to it.

"The next step is to get InMoov on its legs. I'm certain that he will be able to stay standing and stabilised on his own. To get him to walk is another story," Langevin concludes. "I will just keep designing and we will see if it ever happens. A year and half ago I had just got my 3D printer and I had no idea I could create a robot, so I'll just keep dreaming and imagining it's possible."

Building InMoov

"Back when I had only built two arms and the first shoulders, I could control them with Arduino scripts, which I had to learn since I had never done robotics before," Langevin explains. He has since discovered MyRobotLab, where he can now source programming support in developing InMoov's movements.

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Images of the month

These are the illustrations that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

A Teacher's Nightmare

» **Omer Messler, Adi Cohen**

3DA username Omer Messler

Omer says: "This was a collaborative work with Adi Cohen. We decided to combine our skills and create a highly-detailed scene that emphasises each of them. I worked on the interior, textures, render and post-production, while Adi worked on character modelling, texturing, rigging and posing."

We say: *We love a single image that tells an entire story, and this does so perfectly. These kids just won't be told! It's also a great example of what can be achieved when two artists work as one.*

B Hague bedroom

» **Ângelo Miguel dos Passos Fernandes**

3DA username Angelo Fernandes

Ângelo Miguel says: "This is one of the images I submitted for the Hague Apartment contest. I wanted to give a feel of cosiness and also to explore a different perspective from what we usually see in arch-vis."

We say: *We just love the sense of ambience here. Just looking at this image you get the feeling it's a cosy, warm Sunday morning. From a technical standpoint, the crumpled bed sheets are amazing!*

C Bumblebee

» **Valentino Szemere**

3DA username Valentino Szemere

Valentino says: "This was a personal challenge. I saw some close-ups of insects and I wanted to see how close I could get to the real thing. It's almost 100% 3D with very little post in Photoshop."

We say: *This is a very tactile render – the bumblebee feels plump and the fur on his body soft and smooth, while both his wings and the frayed petals of the flower give the impression of being both delicate and fragile.*

D The Green Mile

» **Taha Alkan**

3DA username Taha Alkan

Taha says: "I've always adored the charm of winter scenes. For a long time, I noticed that Japanese artists are really competent when it comes to using simple colour compositions in a single frame to evoke emotion. I attempted to capture this artistic mentality in my work."

We say: *This image may mostly consist of shadowy blues, but its nevertheless extremely evocative. The glow from the aurora above and the faint light form the house windows give warmth to the otherwise cold tones.*

C

Image of the month

The Dancer

» **Andres Zorrilla**

3DA username Andres Zorrilla

Andres says: "This sculpture was created in ZBrush and rendered in Maya, with the composition completed in Photoshop."

We say: *We're always a fan of ZBrush sculpts that strive for anatomical accuracy. It's no easy task, especially when working towards non-standard poses, which is what makes this work by Andres so impressive.*

Borrowed Ornaments

» **David J. Macias**

3DA username DavidMacias3D

David says: "I wanted to create a Christmas image that radiated that magic feeling we had when we were kids. I also wanted to evoke the feeling of wonder of seeing into a smaller world."

We say: *We just missed the Christmas period with this one, but we had to get it into the magazine anyway, as it's a great example of how to use colour tones to achieve a feeling of warmth.*

Cat Project

» **Ricardo Coimbra da Rocha**

3DA username Ricardo Rocha

Ricardo says: "This was a personal project to study and improve my knowledge of animal anatomy and fur look-development. I plan to eventually produce a small short movie featuring my digital cat."

We say: *A simple yet effective image. The fur and hair is impressive, with areas such as the neck of the feline character verging on entirely photorealistic.*

Smile

» **Luca Nemolato**

3DA username Nemolato91

Luca says: "Smile is a hero robot – an ex-cop robot reprogrammed to serve a rebel cause. He's a deadly shooter, but funny, laughing every time he makes a kill."

We say: *It's important to think of a narrative or background for your character before starting work. Here Luca's story has played into the character's design. We imagine the makeshift paint job was most likely created by the rebellion's own re-programmers.*

Steam Mags

3D Artist followers:
183,569 z-axis zealots

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Top tweets

Get involved...
@3DArtist

@NinjaDragonKick Here's a picture of a custom motorbike I made for college!
3D Artist: Awesome stuff Kieran, love it!

@mrHarryGG Took part in @3DArtist magazine's Discover the art of Rigging article. Good stuff! Shame my name is spelt wrong...

3D Artist: Ahhh! We're mortified to hear this. The guilty party is suitably ashamed, fear not. Check out Harry Gladwin Geoghegan's work online at www.mrharrygg.me

On the Wall

Facebook.com/3DArtistMagazine

Guess which magazine won the Social Media Award last night? Thanks so much to everyone for your support!

Marlies Tang Congratulations (btw, love the frogs!)

Ângelo Vil Phernandes Congratulations, you deserved it!

Margaret McMahon Hurrah!

If you want to have your work or thoughts displayed here, get in touch with us via email at **3dartist@imagine-publishing.co.uk**, via Facebook at **facebook.com/3DArtistMagazine** or on Twitter **@3DArtist**

Social media images of the month

Of Butterflies and Astronauts **Facebook likes** 1,293
» **Markus Nowak**
Markus says: "This was my first artwork in Blender. It's old, but I thought it was time to share it with the community. Sculpting was completed half in ZBrush and half in Blender."

Laundry Line **Facebook likes** 1,070
» **Nicolas Pellkofer**
Nicolas says: "I created this as a gift for my girlfriend and also to learn a little bit more about Maya and its capabilities."

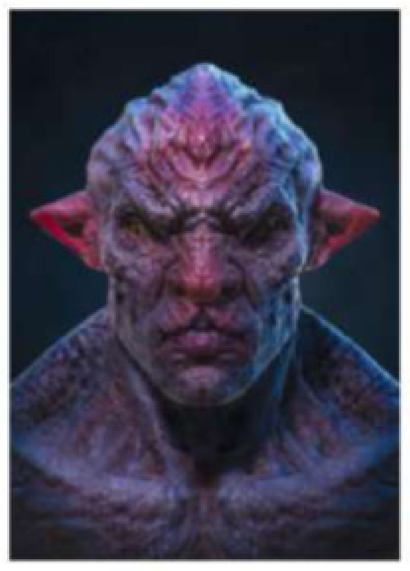
Curious...

How can I make this effect in Photoshop or by using another 3D program?
Nicolai Lassen, via Facebook

We'll let **3D Artist** regular contributor and CG guru, Gustavo Åhlén **(www.facebook.com/gustavoahlenstudio)**, answer this: *You can do this in ZBrush, using brushes for the ornamental patterns. The dents can be added in other 3D software. It's just like a kaleidoscopic picture – you only need to create a quarter of the complete image. Once you get the final mesh, assign a gold material and render that quarter. Use Photoshop to replicate that quarter three times to get the complete image.*

YOUR TOP WALL POSTS

Bo-a
» **Hosien Mohamadian**
Hosien says: "This project was based on a concept by my good friend and fellow artist Paria Esmaeeli. It was created using 3ds Max, ZBrush and Photoshop in post-production."



Alien
» **Zhang Yongqiang**
Zhang says: "This is my latest artwork – an alien concept design. It was modelled in ZBrush and textured in Photoshop, with render passes in V-Ray for Maya to finish everything off."

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Mr. Peabody & Sherman:
Reimagining 2D

We travel WABAC through time to the world of Mr. Peabody & Sherman, discovering how DreamWorks Animation tackled the challenge of adapting Jay Ward's original 2D designs into glorious 3D

Interviewees

Tony Williams
Head of modelling
DreamWorks Animation

Lucia Modesto
Character TD
DreamWorks Animation

Jason Schleifer
Head of character animation
DreamWorks Animation

© DreamWorks Animation

For many modern animators, Jay Ward's work is legendary. He was the creator of the very first animated series produced specifically for television, *Crusader Rabbit*; he produced the original *George of the Jungle* cartoon; and he even designed the iconic sea captain first used to promote Cap'n Crunch. What Ward is perhaps most famously known for having produced, however, was *Rocky and His Friends* – the series that introduced Mr. Peabody and Sherman to the world.

First launched in the late 1950s, the cartoon show consisted of an episode of Ward's *Rocky and Bullwinkle* at the head and tail of each half-hour, along with various five-minute segments mixed in between. It's now considered to be the very first animated series that purposely appealed to both adults and children. With it, Ward had introduced a cartoon that combined light-hearted, silly comic entertainment with wry humour, topical satire, social commentary and plenty of puns. He had revolutionised the industry for good.

Ward's show also introduced the 'Peabody's Improbable History' segments. *Rocky and His Friends* already included humorous takes on famous fairy tales, fables and poems with 'Fractured Fairy Tales', 'Aesop & Son', and 'Bullwinkle's Corner'. The 'Improbable History' segments were created in a similar vein – as humorous new takes on famous historical events. Starring dog-genius Mr Peabody and his adopted human 'pet' Sherman, the episodes would follow the adventures of the stylised cartoon duo as they travelled through history using Peabody's WABAC or 'Wayback' machine. There, Mr. Peabody would use his heightened intelligence to save the day throughout major historical events, all the while imparting an entertaining history lesson to Sherman and, therefore, the audience. Despite the segments being only a few minutes in length, Mr. Peabody and Sherman became widely well-known, having since been featured in modern animations such as *The Simpsons* and *Family Guy*. Even the Internet Archive's Wayback Machine program is named after that of the cartoons.

In 2003 Tiffany Ward – who had taken over her father's company following his death in 1989 – started to explore the idea of creating a *Mr. Peabody and Sherman* movie together with director of *The Lion King*, Rob Minkoff, bringing it to the big screen for the first time. For DreamWorks, which announced its plans to join them in the creation of the computer-animated adaptation three years later, the stakes were very high indeed.

3dartistmag.com

"We're all here on a couple floors at DreamWorks Animation. It's easy to walk over, talk about work, go back to your desk and make a change. It's very collaborative," says Williams

Translating to 3D

"You know, Mr. Peabody and Sherman are great characters, but in the original cartoons they didn't go into a lot of detail about the relationship between them," begins Tony Williams, head of modelling on *Mr. Peabody & Sherman*. "It seemed to us that there was a great opportunity to push that and to make a whole feature that dealt with the relationship."

Though a crucial aim for the team was to retain the spirit of the original series – many of whom were fervent fans of Ward's original cartoons – one of the first hurdles was to develop the story so that it would work for a feature-length film, as well as update it for contemporary 3D audiences. They quickly decided on the movie's central theme: the unlikely father and son bond between Mr. Peabody and Sherman. This would include the alienation that such an unusual family would face from the outside world, as well as the idea that the only thing Mr. Peabody's genius could not possibly fully prepare for would be parenthood. "From there it was just trying to do justice to the original designs," Williams continues. "Trying to get from these beautiful drawings and wondering: what are they going to look like in 3D?"

"It was also a strong goal of ours to have a very graphic and clean style," explains DreamWorks Animation head of character animation, Jason Schleifer. "Our production designer David James, art director Tim Lamb, VFX supervisor Philippe Denis and director of pre-vis Kent Seki worked very early on to make sure that the look of each scene was tightly art-directed, spending lots of time designing the shape and tonal language of the film."

Of course, taking these very recognisable and heavily stylised 2D characters, then translating them into modern designs that needed to look good in 3D yet be similar enough to the originals to excite nostalgic viewers, proved to be a huge challenge for the team. This was especially difficult considering that the hand-drawn versions were designed with a far more limited animation style in mind. "Just thinking about how proportions change when you go from 2D to 3D was a challenge," remembers Williams. "For instance, Peabody's nose became gigantic when we actually did the 3D, and from an acting standpoint you're always going to be concerned with having eye lines for animation, so that was a problem. There was a lot of discussion about whether we should make the nose shorter or smaller, but everyone in art was really fighting to maintain the original character. Thankfully we all agreed that keeping the right proportions from the cartoon was the best thing to do."

Maintaining the original proportions of Mr. Peabody's nose became particularly restrictive when it came to animation, limiting the range of angles from which the character could be shot in the final feature. With 2D, this was something animators could cheat with by making the snout slightly shorter or longer, depending on the angle he turned his head, but it would be too easily noticeable considering the film's stereoscopic 3D. Nevertheless, these were issues the animation team were fully willing to deal with if it meant the original stylised aesthetics could be kept intact. In fact, another major aim throughout production was to make sure the final Mr. Peabody and Sherman characters never became too detailed or realistic. This was particularly difficult for a team of artists capable of delivering some of the most meticulously and beautifully produced imagery in the industry.

"I think the concern would be if we went more detailed that it would start to be further away from the original concept and cartoon," says Williams, revealing that the modelling team comprised of only eight or nine people on average. They worked on the film for around two and a half years, touching on everything to make sure that it looked minimalistic and clean, yet stylised, right down to details such as the asymmetrical light switch in Sherman's room. "To have to keep it so clean was very different," he explains. "The last movie I was on was *Puss in Boots*, which was very much about needing more cracks on the walls or detail on the ground. This was very different. Here it was 'no, no, no, just squint your eyes and look at the composition, we want these beautiful lines and we don't want small details to break up those lines'."

> "If you look at the models, you realise they're built evenly: if you get characters too heavily laden with detail or anatomy I don't think it works, I don't think you can animate with that much joy and playfulness"
>
> **Tony Williams,** head of modelling

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Even when work on a character is supposedly completed, Williams says there will still likely be 10 to 15 further changes later down the line

The team used a research library to discover more about artefacts and historical environments, then interpreted them to fit within the style of *Mr Peabody & Sherman*

Historical research

"One of the joys of the original show was that the stories and animation made reference to true historical data, but weren't rigidly locked to it," says head of character animation Jason Schleifer. "We did our research on the time periods we were visiting and were accurate to the themes and feelings of the time, but we didn't want to replicate it exactly. For example, in Florence we wanted to make sure the Ponte Vecchio was immediately recognisable, but it still had to fit into the shape and language of our film." The team didn't stop there, even going so far as to bring in a time-travel expert to help them by discuss current theories and beliefs held about time-travel possibilities.

The challenges of time-travel

Pre-production on *Mr. Peabody & Sherman* sounds like a character designer's slice of heaven, with more than 140 unique heads that had to be devised for the film's hundreds of historical figures, ranging from Egyptian rulers to French revolutionaries. It was time to get the creative juices flowing. "In the Modelling department we used a combination of Maya, Mudbox and ZBrush," says Williams. "Maya is the workhorse, which is where most of our work is done, but a lot of the heads were quickly sculpted in ZBrush or Mudbox depending on the artist.

"If you look at the models closely, you realise they're built evenly and I think that's part of the reason the animation was so wonderful: if you get characters too heavily laden with detail or anatomy I don't think it works, I don't think you can animate with that much joy and playfulness," he continues. "From a technical standpoint it was all about keeping the model extremely clean, with pretty much all quads because that just deforms cleanly, no matter how much you push of pull it as a baseline."

In making sure that they developed a common topology, the team could ultimately enable each of the characters in the film to blend shape into any other character – a brand new technique for DreamWorks. The approach greatly sped up the rigging process: as the vertex and face order was the same, the rig would be able to quickly snap into the correct position. This was hugely beneficial when dealing with so many different characters.

"The rigging challenges on this production were the sheer numbers of rigs necessary in a time-travel movie," begins character TD Lucia Modesto, revealing that another method used to speed the process up was to recycle assets from past shows. "It doesn't make sense to reinvent the wheel in every production, so starting from an existing rig enabled us more time to tailor the development to the production's specific requirements. For instance, the facial rigs were based on *Turbo*'s human facial rigs and adapted to allow for more exaggerated, cartoony motion. The animators could even turn on extra arms and legs in order to convey the idea of fast limb motion. The same is true for our head and hand lattices, with which the animators could warp the shape of the head and hands to achieve extreme squash and stretch."

Another challenge that came hand-in-hand with that of creating hundreds of historical figures was the variety of different environments required, comprising many various locations and time periods. "The number of sets that we were able to push through was great. It kind of makes our job three-times more fun when we go from New York to Italy to Troy, it really breaks it up," says Williams with a smile. "The clean level of detail didn't really change throughout the environments, but I think what changed was how the design was applied. With Peabody's pad everything is rectilinear and airy, the lighting is very soft; it's a place where I'd want to live! Then, if you jump to probably the darkest part of the movie – when they're in Troy and Sherman and Peabody are having a father-son tiff – the sets are still extremely simple, but everything becomes very vertical. The design is very tall, everything's elongated and high up, so that creates a little bit of tension. Obviously the lighting does a very good job of setting the mood too, which is dark and ominous with torches. If you look at every sequence, there are some great changes throughout the movie."

Reimagining 2D

The film's world had to be believable, even though the concept of a dog-genius isn't. The relationship between the two protagonists was therefore key

Animating opposites

"In the Animation department, our aim was to make each character unique and specific in terms of their acting choices and poses. We really had fun delving into their personalities," begins Schleifer. Key to the process was the fact that Sherman and Peabody were animated to be opposites. Mr. Peabody was smooth, refined and an extremely capable character whose reactions to any situation would be confident and considered – a stark contrast to Sherman, where the team had fun exaggerating the cartoony physicality of a seven-year-old boy, with more frenetic energy, squash and stretch. There was also the fact that Mr. Peabody is in fact a dog, and as such needed to display both human and canine qualities – a tough challenge when you consider that he is also a genius, able to turn his hand to anything from playing the piano to surfing.

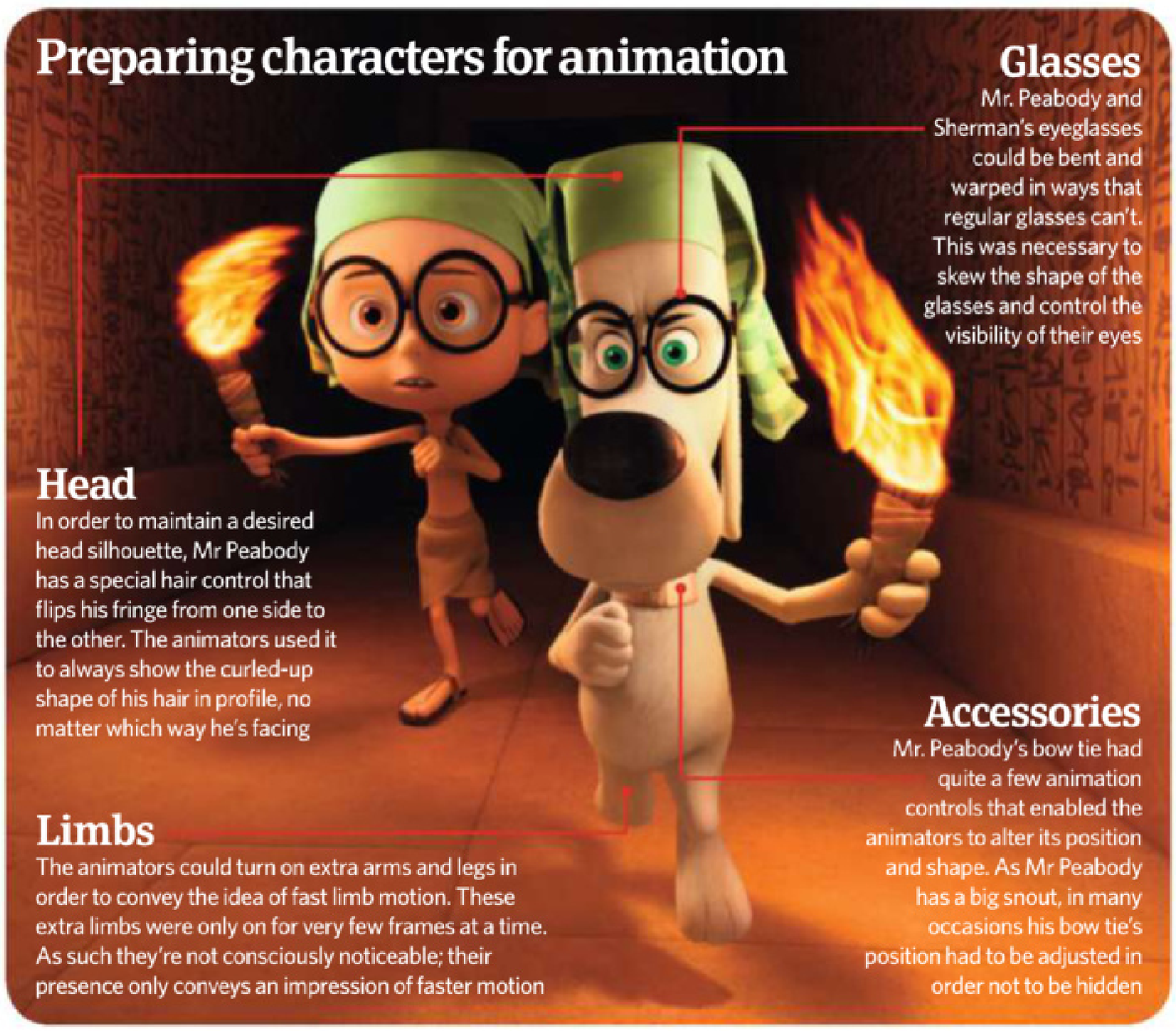
"In fact, this is one area where our movie and the original series differ in how he is performed," Schleifer continues. "In the original show, Mr. Peabody spends much of his time as a quadruped, walking on all fours and sitting as a dog. In the movie, Mr. Peabody doesn't really consider himself a dog. We discovered that it was best to treat him mostly like a human, then let his dog behaviour come out only as an instinctual act."

Mr. Peabody also had to be able to talk and express a range of character traits worthy of one of a central protagonist. "One of the great aspects of the original Mr. Peabody design was the way that his mouth was handled," says Schleifer. "Sometimes Mr. Peabody would speak from the very front of his muzzle, sometimes he would open his jaw right up, with the corners of the mouth coming all the way back towards his neck. When drawn by hand, this is a very simple thing to achieve. However, in 3D it's quite complicated, as there is a lot of geometry on the muzzle that needs to compress and stretch quite a bit. The rig needed to enable the corner of the mouth to sit on the front of the muzzle, as well as to pull all the way back towards the neck. We redesigned Mr. Peabody's mouth more than once to find a way to allow for this type of motion and retain the graphic simplicity we desired."

The day-to-day animation routine on *Mr. Peabody & Sherman* would start with a dalies session with director Rob Minkoff, where the animators would show him the progress of shots being worked on. "Since Rob was located in our Glendale campus and over half of the team was in our Redwood City campus, each session would be held over video conference," continues Schleifer. "The cool thing is that we have our computers synced across locations, so we can both be watching the same movie at the same time. We scrub in sync, draw on frames and also record the reviews so Rob can act out his ideas and the animators can refer back to the notes whenever they like."

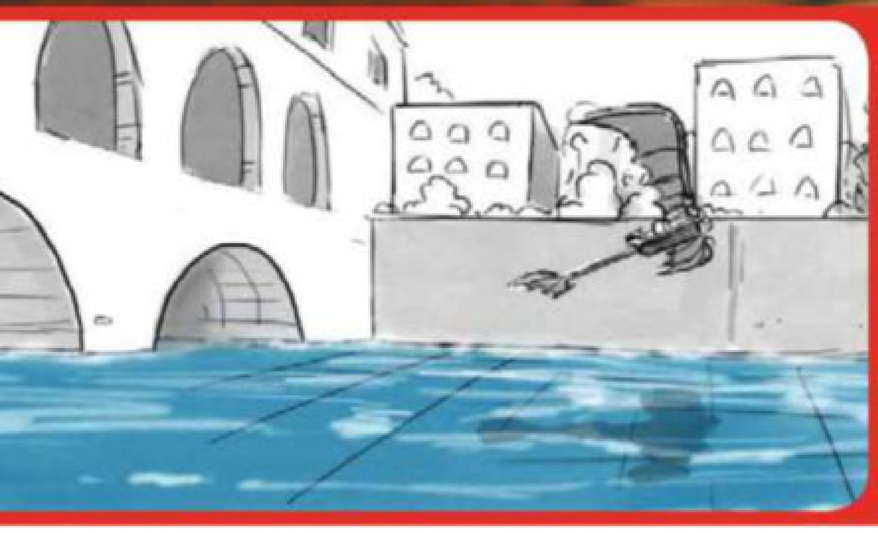
Despite the comedic animation performances, Schleifer tells us that Minkoff was a strong believer in purposeful movement. Though seemingly simple, every motion needed to have meaning and control. "It's a very demanding job, but it's also a ton of fun," says Schleifer. "Where else can you dress up in a wig and glasses, run around in front of a camera, goof around with friends, or obsess about the most subtle details of an eye-dart?"

Preparing characters for animation


Glasses
Mr. Peabody and Sherman's eyeglasses could be bent and warped in ways that regular glasses can't. This was necessary to skew the shape of the glasses and control the visibility of their eyes
Head
In order to maintain a desired head silhouette, Mr Peabody has a special hair control that flips his fringe from one side to the other. The animators used it to always show the curled-up shape of his hair in profile, no matter which way he's facing
Limbs
The animators could turn on extra arms and legs in order to convey the idea of fast limb motion. These extra limbs were only on for very few frames at a time. As such they're not consciously noticeable; their presence only conveys an impression of faster motion
Accessories
Mr. Peabody's bow tie had quite a few animation controls that enabled the animators to alter its position and shape. As Mr Peabody has a big snout, in many occasions his bow tie's position had to be adjusted in order not to be hidden

> It's a demanding job, but it's also a ton of fun. Where else can you dress up in a wig and glasses and run around in front of a camera?
>
> **Jason Schleifer,** Head of character animation

The DreamWorks team opted for very clean visuals with a minimalist approach to detail; the assets are stylised yet simple, much like in the original cartoon



Creating generics

"I think our generic characters actually look very good, I love the size discrepancy between them," says Williams. "The biggest guy was almost nine feet tall and the smallest was six-foot one. Normally you don't see such a scale change but we were allowed to be really playful and just push the fact that this is a cartoon. I think the biggest way we changed those people throughout the film was with the clothing and the hairstyles. You'll see the same body or head in New York and Troy but it won't be noticeable and it won't bother you because the hairstyle will be different, which is a huge signifier, so getting that right was a lot of work. Surfacing also helped. If it were further back in time, people had a different complexion – they looked dirtier!"

Reusing the generic characters without the audience noticing was a tricky part of production, but helped the team focus on other creative areas

Inspiring a new generation

Released 55 years after the original television launch, *Mr. Peabody & Sherman* is more than just a new comedy from DreamWorks Animation. It's enabling Jay Ward's evergreen designs to live on, continuing the admirable work of imparting history lessons to a brand new generation.

"Making sure that the relationship between Mr. Peabody and Sherman felt authentic was a big goal," says Schleifer. "It was important that we put across that even though Mr. Peabody is an extremely accomplished individual, he is still a parent and as such has the same desire we all have – to love and raise our children to be successful members of society. Like most of us, he too feels that it can be difficult to let go and let your child be themselves.

"I'm so happy with the result of both Mr. Peabody and Sherman," he continues. "They are two characters that have become people I truly enjoy spending time with. I thoroughly appreciate Peabody's ability to handle any situation, his wry smile, his physical prowess and his love for Sherman, who is the most excited, innocent and genuine character I've seen in a while."

For Williams, the biggest success will come with the audience's ability to identify not just with the new characters, but with the old ones too. "I personally think that's one of the most important things that we could do in this case. We weren't trying to break these characters and make them something totally different. The humour has been translated and updated, but it's still there."

"Overall, it was really fun to have such a variety of different work every day," concludes Williams. "I'd walk over to one artist and they'd be doing Italy, then to another who could be handling generics. It's a really great mix of different types of work. Yet I think the most important thing to me is that the audience feels that there's a connection between Peabody and Sherman. At the end of the day that's what all this design, texturing and lighting is for – to tell a story."

We're certain that, were he alive to see it, Ward himself would be more than proud with the way his long-lasting creations have been handled.

Mr. Peabody & Sherman is in cinemas 7 February

> "The important thing is that the audience feels a connection between Peabody and Sherman. At the end of the day that's what all this texturing and lighting is for"
>
> **Tony Williams,** head of modelling

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Apple & THE 3D PIPELINE

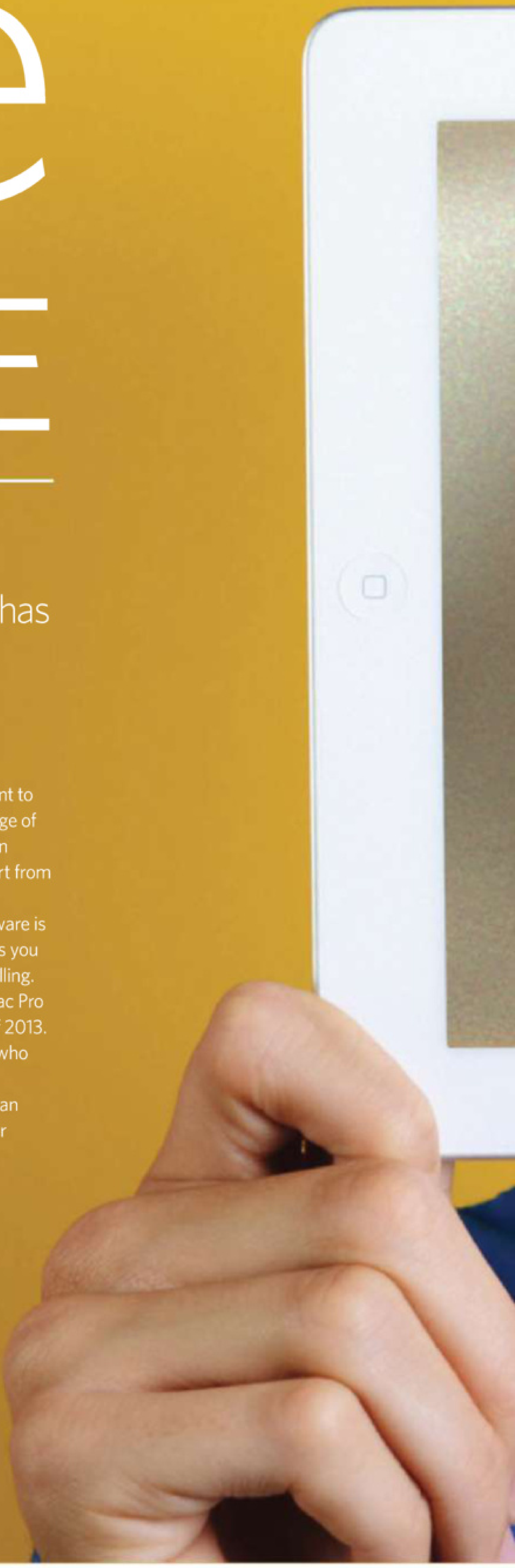
3D workflows demand flexible storage, the most powerful graphics cards and render times that can stretch to hundreds of hours. Can Apple keep up, or has it been wrongfully overlooked by the world of 3D?

In creative environments, you're never far from someone working on an Apple device of some description. Graphic designers use Macs almost exclusively and they're hugely popular tools for audio and video as well.

However, the situation is different with 3D design, where Windows and Linux-based workstations tend to be the status quo, despite a vast amount of modelling software available for OS X. While for some a preference for either Windows or OS X can verge on religious devotion, there are complex reasons for the disparity between Macs and PC workstations in modelling environments.

Over the next few pages we'll investigate what it's like to use a Mac for rendering and what needs to be considered before making a commitment to either format. Here **3D Artist** has asked a range of experienced designers about their opinions on modelling in OS X, as well as what sets it apart from the usual PC crowd.

We'll also consider the software and hardware is available, as well as which of Apple's products you should buy if you're serious about Mac modelling. We've also spent some time with the new Mac Pro workstation, which went on sale at the end of 2013. With a specification heavily slanted to users who demand high performance, including dual workstation-class graphics cards, it could mean rethinking whether or not a Mac is suitable for today's heavy-duty rendering work.



Apple and the 3D pipeline

I'm a Mac and I'm a PC

Early on in the history of personal computers, Apple's Macintosh earned a reputation for being a better tool for content-creation than IBM-PC clones running Microsoft's DOS software. Implementing revolutionary ideas from computer science research at Xerox in Palo Alto, California, such as a graphical user interface and a mouse rather than just a keyboard for interaction, the first Macs were quite unlike the other clunky computers of the time, and a lot more fun to use.

A stronger emphasis on seemingly small details such as typefaces, which other firms didn't consider important, only strengthened the view that a Mac was a better choice for those with a creative mind.

Today, the Mac is no longer Apple's most important product, at least when compared with the profit juggernauts of the iPhone and iPad. Yet OS X continues to mature, and in the fields of 2D graphic design, photography and pro-audio, Macs still rule the roost, despite nearly every Mac-based software tool being available for Windows as well.

One reason for this is education. In most design colleges, training is traditionally provided on Macs. Early on, students become familiar with OS X and stick with it throughout their careers. Some argue that OS X is more stable, easier to use or faster than Windows, but much of the evidence is circumstantial, or a matter of taste. These days, a Windows computer won't blue-screen, lock up or slow down like it used to, partly thanks to a better driver model that makes it more difficult for hardware issues to crash the OS kernel.

One unique advantage of Macs (or disadvantage, depending on your view) is that Apple controls both the hardware specification of its products and writes the operating system that runs on it. This means there are relatively few combinations of components to support and therefore software designers know exactly what sort of graphics card and chipset will be used, potentially leading to great reliability and a better overall experience.

In contrast, a near-infinite number of possible hardware configurations can be used on a Windows PC, supported by third-party drivers. This means that it's fairly straightforward to upgrade a PC workstation with a new processor or graphics card, but you can't do this with a Mac. Likewise, when ordering a PC you can choose any combination of hardware you like.

Users who only need a computer for light use are unlikely to worry about this, and 2D design tools such as Photoshop aren't dependent on having the very latest hardware. However, 3D rendering is an incredibly intensive computing task. The ability to use the latest graphics card as soon as it launches, or choose a high-end processor, has a direct result on lower rendering times, making PCs an attractive proposition for 3D artists.

This limitation sometimes leads to artists working in mixed environments, with a Mac used for general work and 2D design and a PC workstation chugging away for 3D work.

For the adventurous, there's the murky territory of Hackintosh computers, which have become easier to build over the last few years. Although OS X can only be legally used on Apple hardware, Macs and PCs use fundamentally identical x86 technology, so there's technically no reason OS X can't be forced to run on very specific PC hardware that closely matches a Mac.

A strong community of hackers over on the site **www.tonymacx86.com** does everything possible to get OS X working on PC hardware, with the benefit of lower prices or more powerful components than Apple offers in its own computers.

While selling such systems with unlicensed copies of OS X installed is likely to result in severe trouble with Apple's legal department, the legality of simple home-brew PC builds has never been tested in court. As relatively few sales are lost to people dabbling with Hackintosh setups, it seems hardly worth the trouble for Apple.

Building a Hackintosh is tricky though, and you will never get quite the same experience as when buying a Mac. However, aside from the Mac Pro, a Hackintosh using a powerful processor and graphics card is one way to ensure superb rendering performance while running OS X.

Unlike other virtual machines, Parallels lets you decouple programs from the main Windows GUI, so they feel like native OS X applications

Boot Camp 101

Using software in a virtual environment such as Parallels will be a lot slower than when it's running natively on a Mac's hardware. Since a Mac is an x86 computer like any PC, Windows can be installed on it in much the same way.

Thanks to Apple's Boot Camp Assistant tool, located in the Utilities folder in OS X, the process is completely pain-free. You'll need a copy of Windows 7 or Windows 8 installation disc, or a USB memory stick.

Run the program and it will download the correct Windows drivers for your Mac, including those for the wireless adaptor, audio and graphics card. These need saving to an external drive and you'll then be asked to partition your hard disk. As long as you have enough free space this won't affect any data on your Mac. Be generous though, since Windows needs space for its program files, virtual memory, system restore and hibernation support – 64GB should suffice.

Once Windows is installed, a new menu in OS X lets you restart into Windows. A similar option in the Windows system tray lets you launch OS X again. If you want to remove Windows from your Mac, the Boot Camp Assistant lets you clean the partition from your drive and restore the space.

With a virtual machine you can run Windows applications on OS X. However, when working this way 3ds Max is notably slower at completing detailed renders

Ricardo Chicaizu created these detailed models using ZBrush in OS X

Apple and the 3D pipeline

The hardware

Only certain Macs now contain graphics cards that can deliver the performance required for 3D rendering work. The Mac Mini, entry-level iMacs and most MacBooks except for the very top-end model use Intel's Iris graphics. These integrated GPUs are a big improvement over previous generations, but are still slower than any modern, discrete graphics card. They're little use for anything more than basic 3D work, aside from their ability to accelerate OpenCL software.

It's the high-end iMacs and forthcoming Mac Pro that are of most interest for 3D content-creation. One big difference between modern Macs and PC workstations is that, aside from third-party memory in the 27-inch iMac, you cannot add new hardware to boost performance. You can't change the graphics card, processor or storage once you've bought your computer, so it's wise to order enough memory or storage from the start, because you'll be stuck with what you choose for some time.

The iMac can be configured with NVIDIA GTX 700-series mobile GPUs. The top-end option, the Geforce GTX 780M, is a powerhouse for gaming, but slightly less so for 3D content-creation. A mid-range Quadro or FirePro in a PC workstation will outperform it. However, these gaming cards are certainly adequate for mid-range 3D design tasks.

The iMac's processor options are rough equivalents of desktop Core i5 and i7 chips, but with lower clock speeds to fit the narrow, thermal headroom of the all-in-one chassis. Most carry an S designation rather than K. The fastest option for the 2013 27-inch iMac is an Intel Core i7 4771 processor, with four cores, eight threads and a base clock speed of 3.5 GHz that turbo-boosts to 3.9 GHz. Xeons are unfortunately not available.

For storage, the base iMac configuration only comes with an old-fashioned hard disk, but you can change it for an SSD with sizes up to 1TB, or a Fusion Drive up to 3TB. Fusion is Apple's branding for its clever caching technology that uses both an SSD and hard disk, moving files between them based on usage frequency. Apple's SSDs are all PCI Express-based, capable of better performance than standard desktop SATA disks in PC workstations.

The whole point of an all-in-one computer is that it has an integrated display, and while the iMac's IPS panel isn't quite as good as the top-end professional displays from some firms, it still compares well in terms of brightness, depth of blacks and colour accuracy. However, its glossy reflective surface can be an annoyance.

Be aware that since the iMac is an all-in-one computer, there's less internal airflow than in a standard desktop. Under load for extended periods, you may find it gets particularly hot, with the fans spinning audibly. In a worst-case scenario, too much heat can damage the components, so we'd hesitate before recommending rendering 24 hours a day, 365 days a year with an iMac.

Although an iMac with the right configuration can be used for 3D work, it's the Mac Pro that's Apple's serious rendering workhorse. A radically redesigned model was unveiled in the summer of last year, following years of not providing even basic hardware upgrades to its older version, which left it way behind the technology curve of equivalently priced PC workstations.

The most striking aspect of the new Mac Pro is its diminutive size. It's difficult to believe that this 25 centimetre-high dark-metal cylinder contains a full workstation, although the relative weight is a nice reassurance of what you're holding.

The design places the components around a single large fan that blows air from the top of the chassis, which Apple says is near-silent. All Mac Pros come with two AMD FirePro cards, named D300 or D500 GPUs with up to 12GB VRAM, which appear to be modified versions of AMD's W5000 and W7000 cards. ECC memory, configurable to 64GB, is standard as well.

Inside the Mac Pro you can't swap its processor or graphics cards, but the memory and storage is user-accessible. The PCI-Express SSD can be replaced, but since there is no standard connector,

Warranty Macs come with one-year warranty. Consider an AppleCare protection plan to extend this to three years

Software OS X Mavericks is available for all Macs from 2008 onward. Windows 7 or 8 can be installed using Apple's Boot Camp software

CPU
Apple uses slightly lower-clocked variants of desktop Intel processors

Optical drive
Modern iMacs don't have a built-in optical drive, but an external Blu-ray writer will work perfectly well

Storage
A 1TB Apple SSD is an expensive option, so maybe consider a 3TB Fusion Drive

Memory
The iMac can be configured with up to 32GB of memory

GPU
The high-end GeForce graphics options will work perfectly well with modelling software and support CUDA acceleration

new drives may only be supplied by Apple, at least for now. There is also no internal hard disk, so if you want to add storage, six 20GB/s Thunderbolt 2.0 ports at the rear will be used to connect storage arrays, or two 4K displays and a third via the HDMI 1.4 connector. They can also be used for networking between Macs, useful for a render cluster with each node connected at 10GB/s.

Xeon processors are standard with the Mac Pro too, with a 3.7 GHz quad-core E5-1620 in the base £3,499 model, and other options including a 2.7GHz 12-core E5-2697 v2 available for an additional £2,800.

Mac hardware is undeniably more expensive than a PC kit, especially when you start adding faster processors or additional storage, but the hardware design is also a lot sleeker. You won't find flimsy plastic hanging off the side of a Mac, and even other PC all-in-one designs struggle to match the minimalist aluminium beauty of Apple's hardware. The trade-off between the performance and value you get from a PC workstation with the trendy design of Macs is again a matter of choice.

Starting at £2,499, the Mac Pro might seem expensive to the casual consumer. However, 3D designers are used to paying high prices for top-end hardware, and the combination of ECC memory, Xeon processor and dual GPUs may account for a big chunk of that cost.

The Mac Pro uses custom component layouts to squeeze an entire workstation into a tiny cylindrical design

The level of detail in Ricardo Chicaizu's models show there's no reason a Mac would limit your creativity

Tablet technology

iOS and OS X are based on the same foundations and share much of the same code, which originated from the NeXTSTEP operating system. Apple's vertical integration means it's straightforward for 3D software firms, or third parties, to create companion apps for the iPad, enabling for modelling work on the tablet and the sharing of files between mobile and desktop modelling software file formats.

Autodesk has an App called 123D Sculpt, which lets you push and stretch 3D models to your heart's content. It seems logical that making 3D shapes using a finger-friendly interface is more intuitive than relying on a mouse, and sure enough very fine adjustments can be made on the iPad in a process that overall feels far more natural. When you've finished your sculpt, the model can be exported in OBJ format for importing into a desktop modelling application, such as ZBrush or Mudbox.

iDough, from CrateSoft, is a similar tool, which may be easier for beginners to learn the ropes. With pop-over sliders to adjust aspects of the model and the same ability to export to OBJ-format files, it's another reason why the iPad can be used as a great way to start carving shapes and laying down some ideas while on the move. Again, you can then make final tweaks on your main workstation later on.

Apple and the 3D pipeline

Mac rendering software is just as capable as anything on the PC, as this creation from Adam Benton shows

The software

Nearly all rendering software used for 3D modelling is available for OS X. Blender, LightWave, Maya, ZBrush and CINEMA 4D are all natively Mac-compatible. One major exception is 3ds Max, but Autodesk offers support for running it on a Mac either in a Parallels virtual environment or via Boot Camp. If you weren't aware, it's possible to install Windows on a Mac to run alongside OS X, in case you need to use any software that's not available in OS X (see Boot Camp 101 boxout).

The latest version of OS X is 10.9. OpenGL 4.1 brings it up to spec with Windows 8 and greatly improved dual-monitor support is something all artists will be happy to have. Autodesk's mental ray is accessible on OS X too, with CUDA support.

It's worth noting that, like PCs, network rendering is also possible with Macs. Network rendering can help overcome the limitations of a Mac graphics card, meaning 3D software can be used far more productively. Many modelling tools enable you to dispatch render jobs to any combination of nodes running Windows, OS X or Linux with the correct client software installed and configured. In this way, it's quite possible to have a tremendously powerful rendering setup that's as good as any PC-based render farm, with a Mac running as your main system for modelling.

This is the type of setup favoured by British-based designer Adam Benton, from Kromekat. Of all the artists we spoke to, he was one of the few to work with Macs exclusively for modelling. Benton said he uses a previous-generation, 12-core Mac Pro, with CINEMA 4D as his main modelling tool. When extra performance is needed, he has a pair of eight-core Mac Pros to work on the image. This roughly halves the render times.

"I use CINEMA 4D, which now has an option built into the interface called Team Render," says Benton. "This works essentially via peer-to-peer networking and any machine (PC or Mac) on the network that has the client software installed will be visible and available to be drawn upon for rendering. This could mean that you select a number of clients (as well as the controlling machine you are on) and have an animation distributed in chinks of frames across each machine. The results, although rendered on each computer, are sent back to the host machine for final export."

For others, despite the allure of OS X, the difficulty in upgrading the hardware has forced them to switch to using Windows. The older tower-based Mac Pro enabled you to add new graphics cards, but you can't use cards designed for PCs. They have to be specially designed to run on Macs and carry a hefty premium.

Hasan Bajramovic used a Mac Pro but moved to a PC workstation after getting frustrated with its limitations. "I think that OS X is a really good operating system – it's very intuitive and easy to use and I never experienced any performance issues using the same software on both OS X and Windows," he explains. "However, one of the problems I had back then was that certain software packages were getting updated a bit late compared with Windows, so that was one of the factors that made me switch back to PC."

Ultimately, the question of whether to use a Mac or a PC boils down to personal taste. Some people prefer modelling in OS X and the operating system's environment in general, which has been applauded for its accessibility. For these people, it's worth paying the price in monetary terms and, in some ways, convenience. There are pros and cons to consider, but ultimately, the choice is yours to make.

Three free apps

Shot Designer

Free, Shot Designer Pro Version Upgrade £13.99 ($19.99 US)

Created for directors and DPs, Shot Designer lets animators and filmmakers create animated camera diagrams with shot lists and detailed storyboards crucial to help with pre-production. The app is available for free, with the £13.99 ($19.99) Pro Version giving users access to features such as being able to sync and share the shot designs, as well as folders created with other team members.

Animation Desk

Free Lite version, upgrade for £1.99 ($2.99) iPhone, £2.99 ($5.99 US) iPad

Already boasting 20 million downloads since the tool was first launched, Animation Desk for iPad and iPhone enables anyone to create hand-drawn animations with an intuitive GUI. Users can choose between four sets of frame rates, create layers, as well as apply dynamic background images and sound effects to their work.

Paper by FiftyThree

Free, offers in-app purchases such as Essentials for £4.99 ($6.99 US)

The winner of App of the Year 2012, Paper was designed for creating images on the go with the iPad. A range of essential tools mimicking a pen, pencil, paintbrush and more enables artists to sketch, write, draw and colour using the app's custom ink engine. Users can also use two fingers to rewind to any point in time without disrupting their workflow. Special mention for sketching also goes to Autodesk's Sketchbook for iPad and Mobile.

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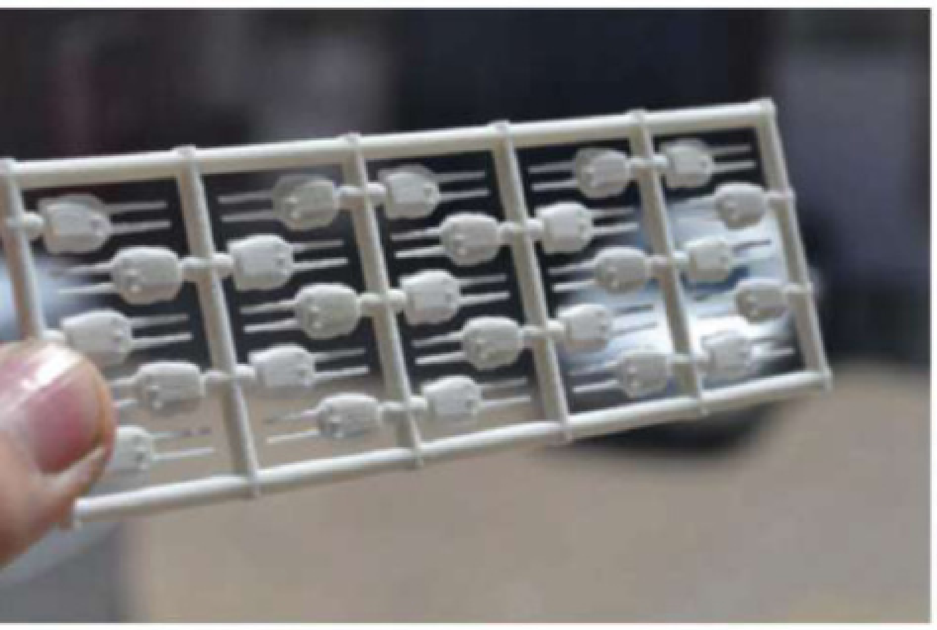
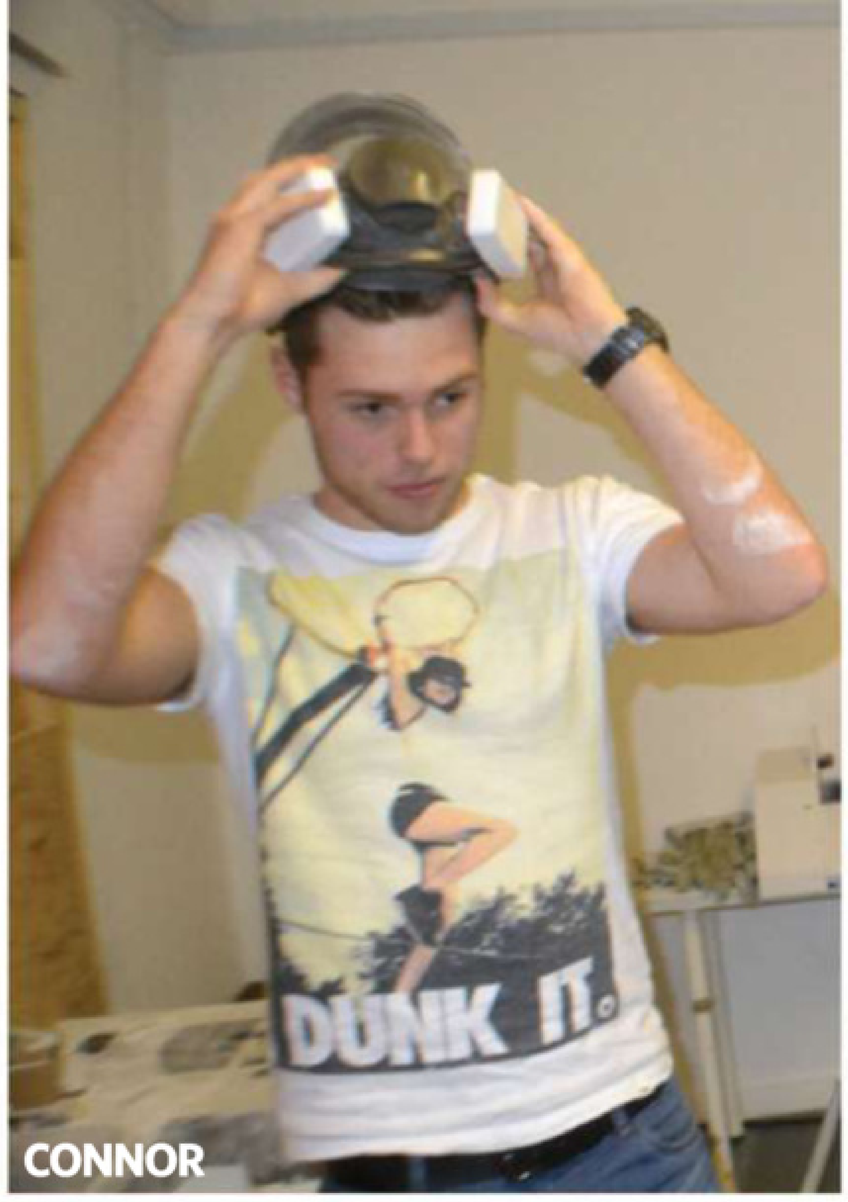




CONNOR

NICK ET AL

3D PRINTING IN ACTION

3D printing is changing the world, but can it change your home? We asked 3DPRINTUK to investigate. Join them as they investigate if 3D printers are truly practical home tech, or just another novelty... Words: **Fred Standeven**

StoreMags.com

Here at 3DPRINTUK, each week can be radically different from the last. In the space of just seven days we might be asked to 3D-print a huge variety of projects, from an invention dreamed up by a seven-year-old child, to a prototype product for a major brand.

Of course, as well as producing our client's products, we also take time to experiment with our own ideas, often testing the limits of what the printers are capable of. We believe that the way in which we use the printers at our disposal could be a feasible forecast for the future of 3D printing in our everyday lives. Imagine a future with a 3D printer available in every living room, capable of producing whatever might be needed at a moment's notice.

3D Artist asked us to take a closer look at how 3D printing might benefit life at home, and to document our findings. So, on the following pages you'll find some of the projects that we've experimented with. We looked to create items that might be useful around the home, making life a little easier...and in some cases a little more fun.

WHO ARE 3DPRINTUK?

3DPRINTUK was set up by designers for designers in 2011, with the aim of bringing a fun and friendly face to the UK 3D printing scene.

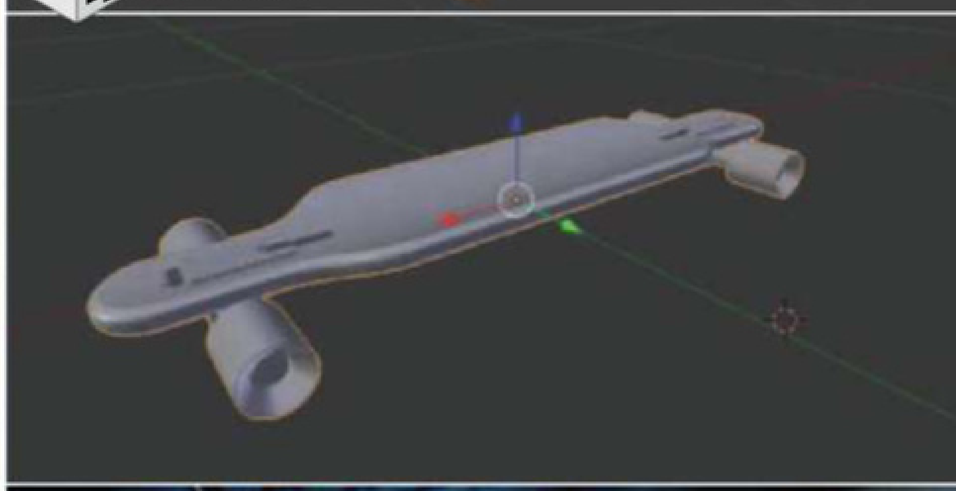
For the last two years the company has been building a bond of trust with its clients by providing the best-quality prints at the lowest prices possible.

From skateboards to robotics, arch-vis, fashion and medical, 3DPRINTUK has been involved in a whole lot of projects. You can go and check them out at www.3dprint-uk.co.uk/stuff-weve-done

3D printing in action

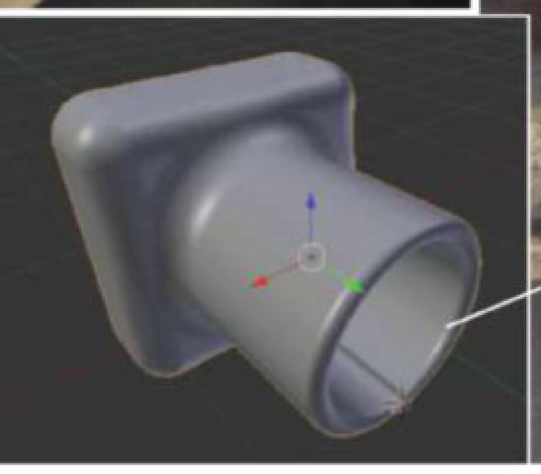
1 RC car wheels

4 Christmas Gifts



2 Wardrobe rail brackets

3 VW Beetle replacement parts



PROJECT 1 RC CAR WHEELS

This particular project began during one lunch break in the office. Driving our remote-control car around a makeshift obstacle course, the vehicle suffered a collision, which damaged the wheel rims. At that point, Tom (Intern #1) chose to take on the task of redesigning the wheels with the intention of 3D-printing replacements for the car.

He set about measuring what was left of the shattered rims and embarked on making some more. Taking inspiration from an existing style of racing wheel, he produced a CAD drawing for the new wheels. We printed the wheels in Nylon using our SLS 3D printer and the results were fantastic. The car is back to its former glory, effortlessly drifting the corridors once again.

PROJECT 2 WARDROBE RAIL BRACKETS

It may not be as exciting as creating wheels for a race car, but the applications of practical 3D printing can stretch to a range of uses.

Our attention turned to Nick (the 3DPRINTUK boss) and his wardrobe. He has been living for too long now without a clothes rail and something needed to be done. The original rail fittings broke some time ago and, in the past, if we wanted replacements the only option would be to buy a completely new wardrobe. Obviously this would be unnecessary and wasteful, particularly now that we can fashion custom brackets ourselves.

One evening Nick quickly mocked up some brackets using measurements from the original rail and in the blink of an eye we had the brackets in our hands. The problem was solved in very little time and Nick's clothes rail is still going strong.

PROJECT 3 VW BEETLE REPLACEMENT PARTS

I have owned my classic VW Beetle for nearly seven years now and, as you can imagine, a 50-year-old car can be temperamental. Things often go wrong, so finding replacement parts can be tricky and expensive. Unfortunately my passion for classic cars is a bit of a love-hate relationship.

It doesn't work every time, but now and again it can be simpler for me to 3D-print whatever part I may need. For example, the most recent replacement part I was looking for was a small plastic bracket that held the parking light bulb in the headlights. The originals were made from Bakelite and deteriorated many years ago. I took a few measurements from what remained of the old bracket and replaced the originals with new 3D-printed parts. Sorted... for now.

PROJECT 4 CHRISTMAS GIFTS

Now this could be the answer to one of the biggest annual challenges that people face across the globe – choosing the right present. Thankfully, this Christmas time the lads at 3DPRINTUK had 3D printers at their disposal. Connor (Intern #2) – who is quite new to CAD – produced a keyring longboard for a friend with little difficulty whatsoever. Tom created some unique Christmas-themed models for his parents based on their interests: for his dad some miniature flying goggles and for his mum a model telescope. Finally, Nick made the revolutionary (and rotary) 'boobpoop' machine for his brother.

In this instance 3D printing gave us a chance to be unique with some truly personal gifts and zero shops were entered in their making – success!

PROJECT 5 VACUUM NOZZLES

Again, 3D printing doesn't always have to be about 3D-printed organs or DIY robots. For a few years I've managed to get along with ill-fitting nozzles that

don't work with my vacuum cleaner. To solve this problem, I took dimensions from the nozzles and vacuum to produce a quick set of 3D-printed collars that would enable the nozzles to fit correctly.

To my surprise they work very well. However, in this case the practicality of 3D printing was called into question. In hindsight maybe we should have checked eBay for this project, as the results might have been cheaper. Regardless, the sense of achievement from making the part yourself is something you just can't buy online!

PROJECT 6 ZOMBIE PURSUIT VOLVO ACCESSORIES

Admittedly, the practicality of this project is questionable, but when it comes down to practicality or fun we side with the latter in nearly every instance.

For some time now Nick has been converting his ex-police Volvo V70 Estate into a *Resident Evil*-esque zombie-pursuit vehicle, as you do. As you can probably imagine, the ideas Nick has dreamed up for this car can't be bought off the shelf in the local store, particularly his next addition. For this he wanted to create a set of gas mask centre caps to fit the Rota alloy wheels on his car.

Nick approached these centre caps slightly differently than the other projects discussed so far. Rather than creating them from scratch, he made a blank centre cap using CAD and then, using our STL fixing software required for running the 3D printers, merged it with a downloaded gas mask model found online. It was all easily done and the zombie pursuit vehicle is one step closer to being apocalypse-ready.

PROJECT 7 USB HARD DRIVE ENCLOSURE

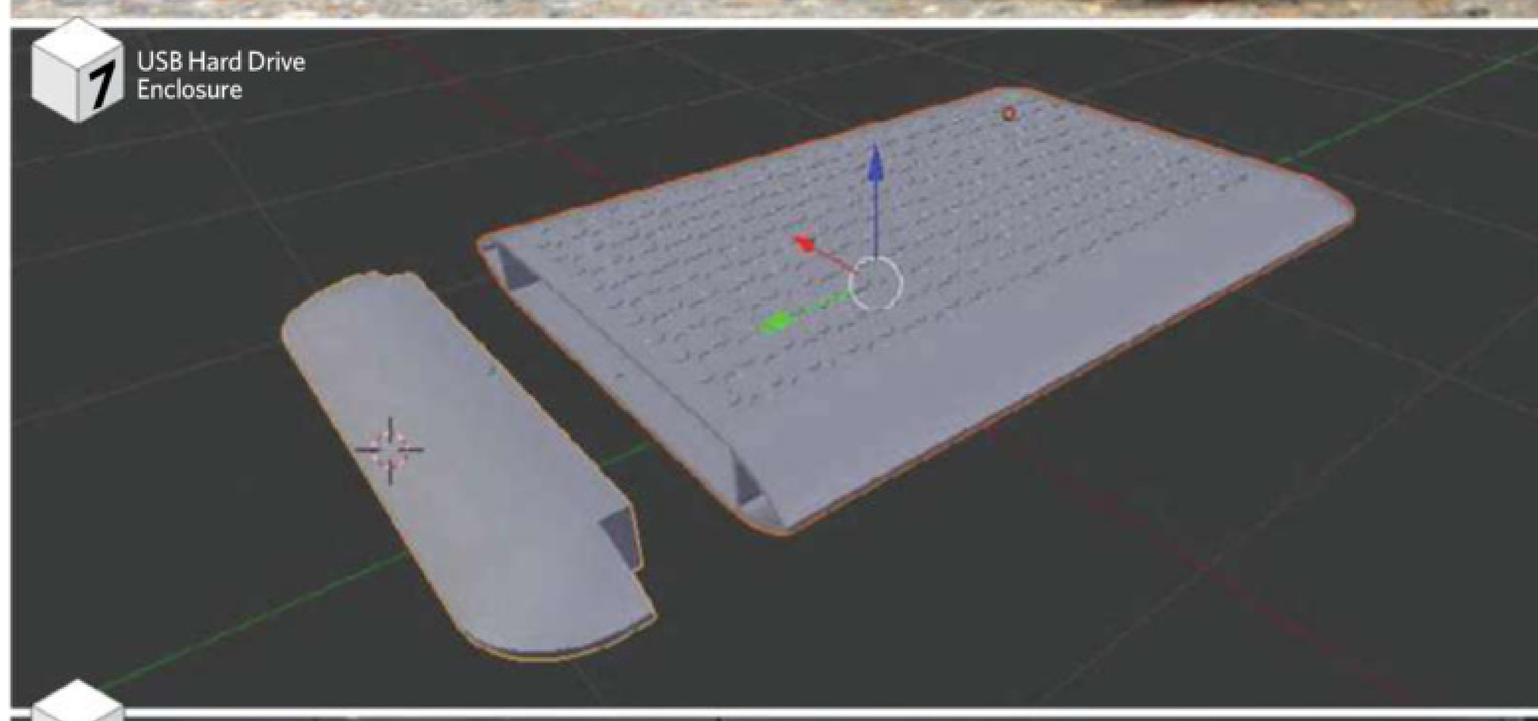
I have been using a battered old portable hard drive for a good few years. The original plastic enclosure had seen better days, but the internal electronics were still working and it would be a shame to throw away a usable product. I set out to design an enclosure that didn't require screws or glue and that could be easily opened to change drives if I wanted.

Taking some inspiration from the old enclosure, I created my own. It took a fair bit of trial and error, but ultimately I managed to create a locking enclosure that worked perfectly.

PROJECT 8 MAC PRO SSD TRAY

I have recently upgraded my Mac Pro to use a solid-state hard drive (SSD) to boost running speeds. However, as the computer's hard drive bay isn't designed for the SSD it was simply hanging inside the computer case, which could potentially see it getting damaged.

A product could be bought off the shelf to solve this problem, however SSD hard drive trays for the Mac Pro are unnecessarily expensive for a little piece of plastic. So, I simply took some measurements from within my computer and mocked up a quick CAD drawing to create a bracket to hold the drive.



3D printing in action

PROJECT 9 SPEAKER FEET

I've always had a passion for music and good-quality sound – this is the reason my desk is home to a nifty pair of Bowers & Wilkins speakers.

The problem is that my London flat is a bit crooked. I'm not making this up – objects I drop will roll to the centre of the room. It's the result of WWII bombing, I'm told. This means that the speakers point slightly down. It wasn't until I propped one of them up that I noticed how this downward slope was significantly lowering the sound quality.

I took some base measurements and identified the thread size of the foot plugs on the base of the speakers. Using this, I created some adjustable feet. I am now able to adjust the angle of the speakers to allow for the perfect sound. I just need to find a way to use 3D printing to stabilise my house!

PROJECT 10 QUADCOPTER

Tom was brave to undertake this project. Quadcopters are known to be highly balanced and refined machines that are difficult to fly, never mind build, but are a whole lot of fun.

Undeterred, Tom took all the necessary measurements from an existing quadcopter kit that he had designed and built a 3D-printable body to mount the circuitry, battery and motors. After a lengthy process of trial and error he finally managed to get the 3D printed quadcopter airborne, although he did nearly lose his fingers. On second thought, perhaps it's advisable not to try this project at home after all...

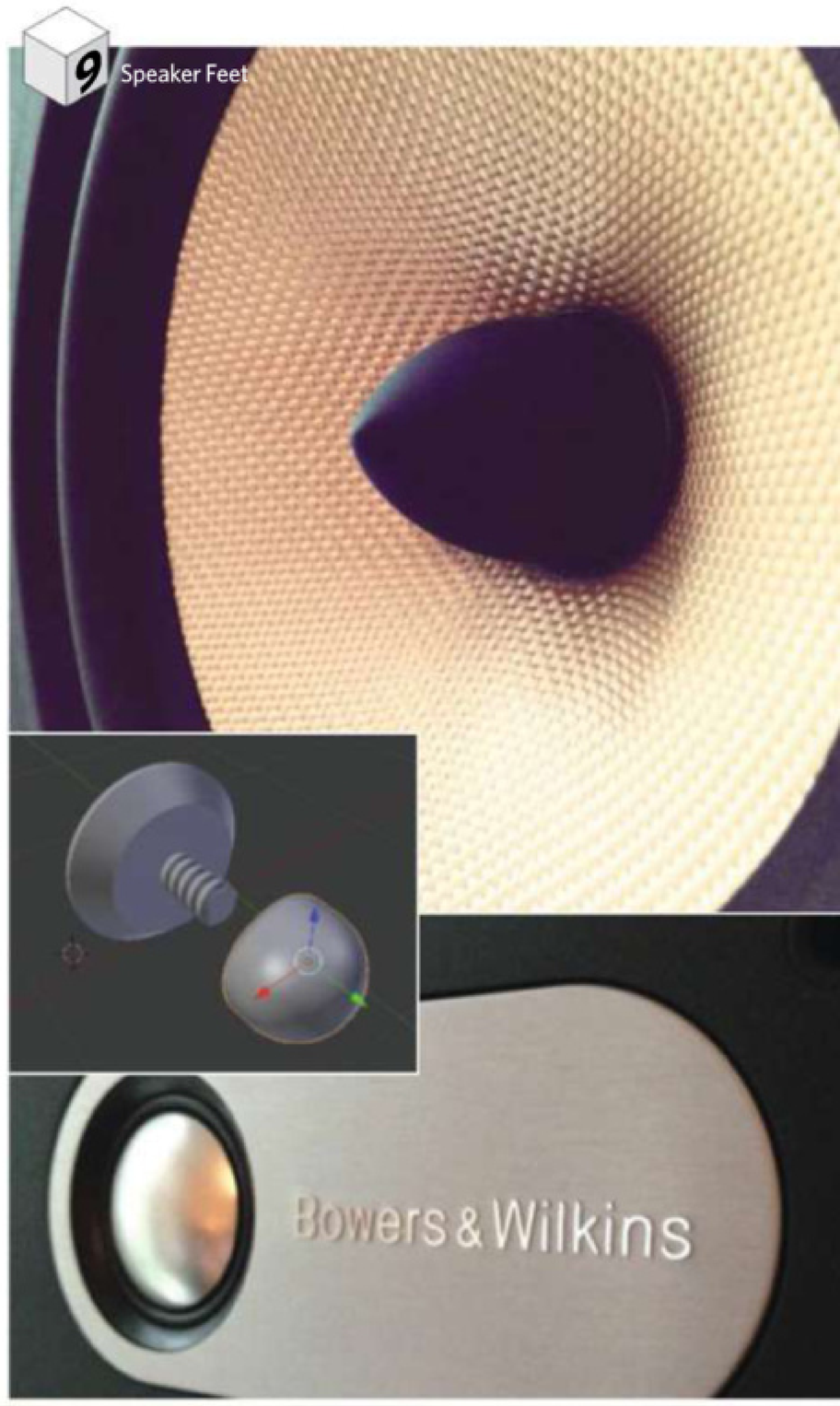
CONCLUSION IS HOME 3D PRINTING TRULY USEFUL?

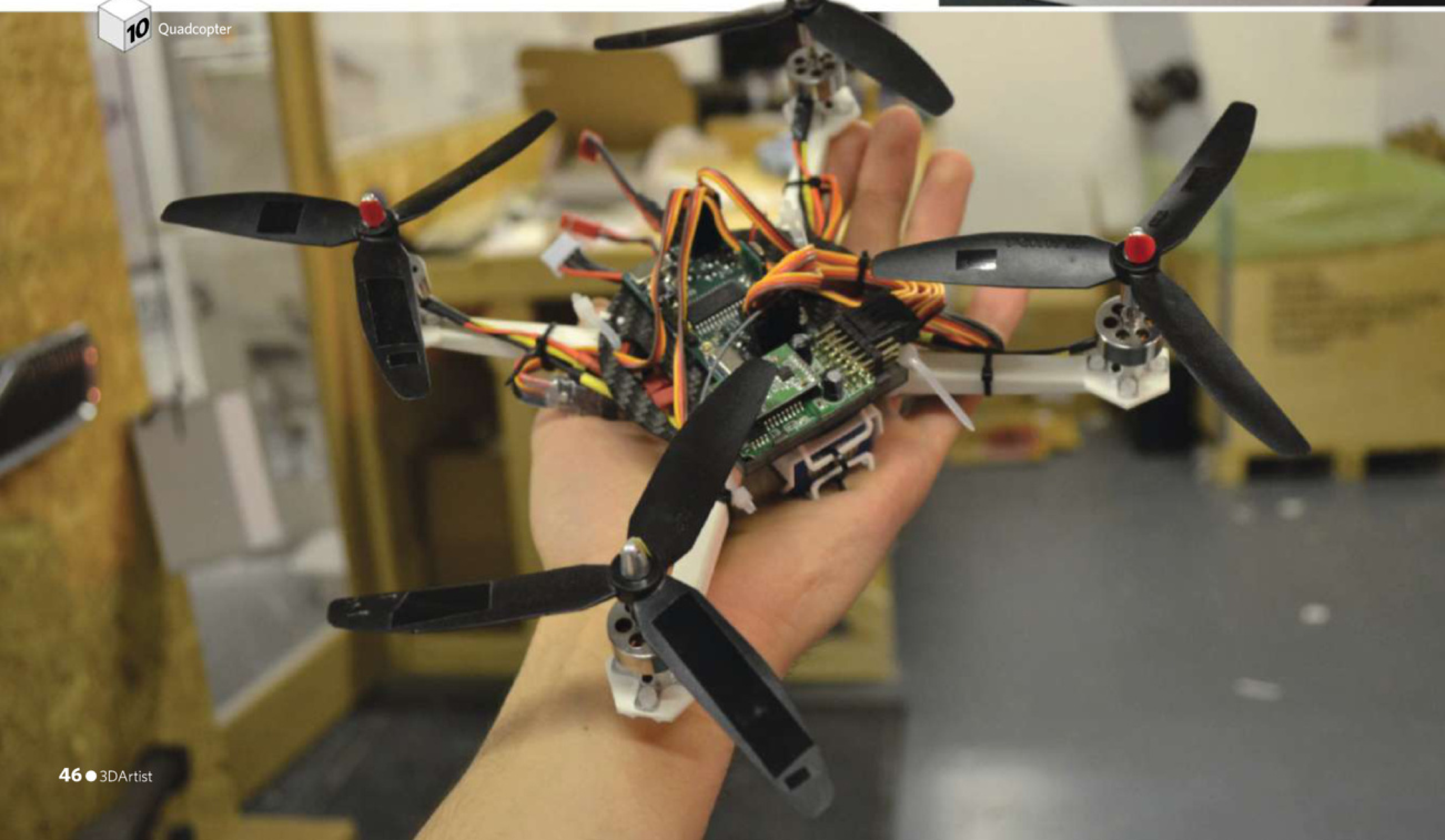
3D printing could be the answer to those annoying little practical problems where you can't always buy a solution, such as Nick's wardrobe rail, or maybe the answer to a unique a problem based on individual needs, such as my speakers. It could also be a cheaper do-it-yourself alternative, such as the Mac Pro SSD adapter. With the right application, 3D printing can be extremely useful and provide people with creative opportunities that would not be possible without the technology.

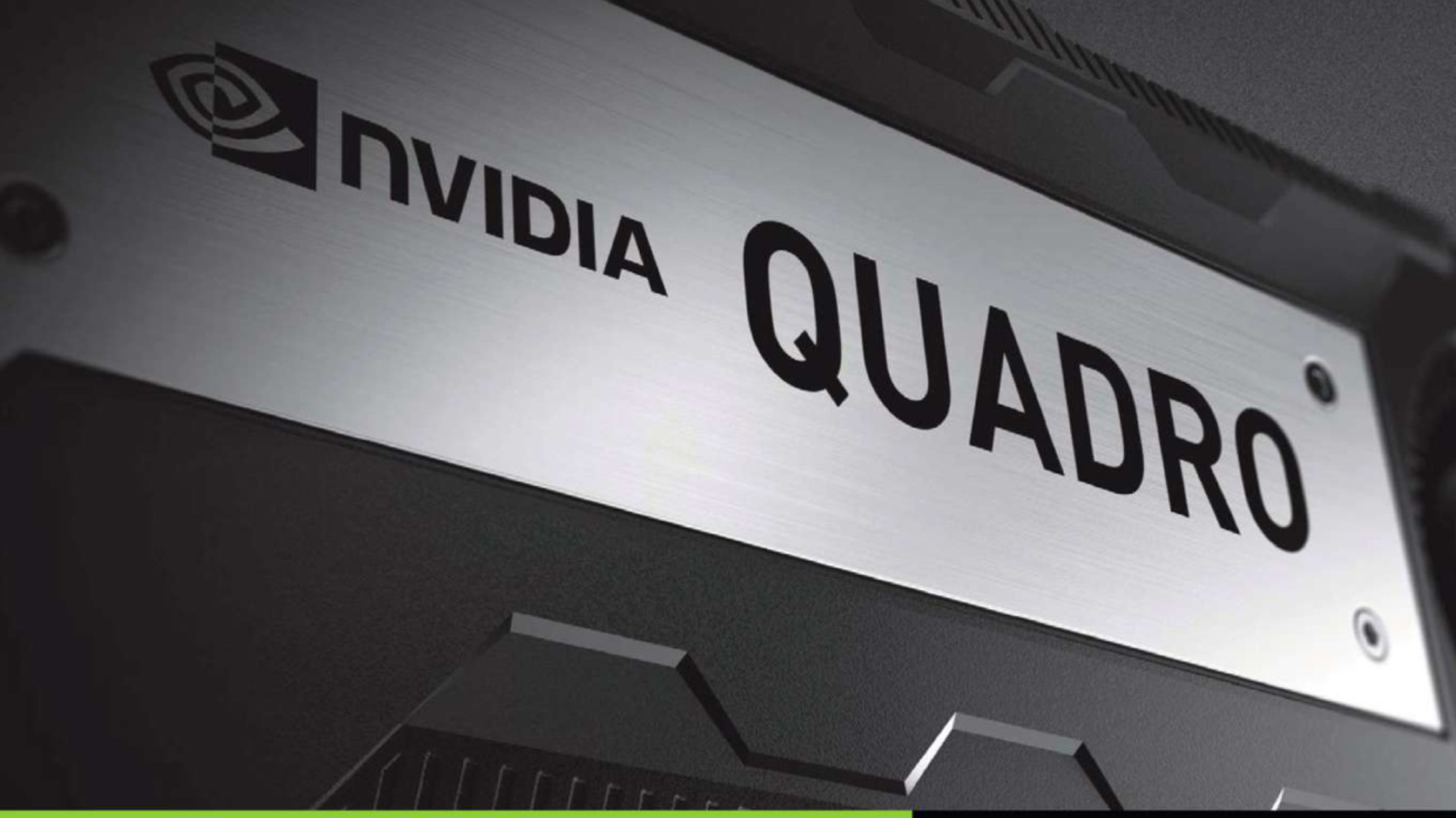
However, as useful as these creations are, 3D printing is still costly and to print a coat hook when you can buy one for less than an English pound seems somewhat lacking in financial sense.

It's also worth mentioning that the 3D printers we use at 3DPRINTUK are industrial SLS machines costing over a quarter of a million pounds. We love the idea of people experimenting at home, but some of the results we have discussed would simply be far more difficult to achieve using current consumer desktop machines.

Nevertheless, these drawbacks aside, we have faith in the future developments of 3D printing. Even at this stage it's a nascent tech, and people are continually discovering new ways in which it can change the world on both a personal and a global scale. We're sure that in the coming years, machines that are able to produce high-quality parts, cheaply and easily, will make their way into the home.







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Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Aldo Vicente

3DArtistonline

Username: AldoVicenteCG

Personal portfolio site
AldoVicenteCG.Wordpress.com

Country USA

Software used Maya, mental ray, Photoshop

Expertise Modelling, textures, materials and lighting

The Maya vehicle pipeline

'67 Shelby Cobra 2014

"A showroom render of a classic roadster: the AC Cobra, popularly known in the United States as the Shelby Cobra"

Aldo Vicente works as a 3D artist in marketing and freelance

Concept

I wanted to make an image that looked like a car advertisement, striving for a certain level of realism balanced against a focus on visual interest and appeal.

Learn how to

- Break down the basic elements of vehicle design
- Model a high-detail car body
- Make the interior and exterior accessories of a car
- Use the mental ray car paint shader to quickly create great-looking materials
- Use mental ray to create accurate materials for the interior and exterior elements of the car
- Use an HDR image and image-based lighting to get effective reflections and realistic lighting

With the Disc

Tutorial files:
- Extra_001_FullModel
- Tutorial screenshots

If you want to learn the process of modelling a complete car in Maya, building realistic materials and lighting, then rendering out passes to composite and enhance a final image, you're in the right place. Here we'll look at how to deconstruct and then reconstruct a complex vehicle body quickly and accurately. This super-efficient modelling method, combined with mental ray's powerful ----tools, make this pipeline surprisingly fast and very fun. We'll be using the '67 Shelby Cobra as our subject, but most of this tutorial can be applied to any type of car, so feel free to follow along with your favourite model. We'll be covering a lot of features and methods, but won't always have room to cover every detail in each one, so I always encourage exploring and experimenting beyond the bounds of the steps. The tools and techniques used here are some of my favourite, but I've seen a lot of different methods used to achieve some great results. Remember that it's all about exploring, learning and having fun to find the workflow that makes the most sense to you.

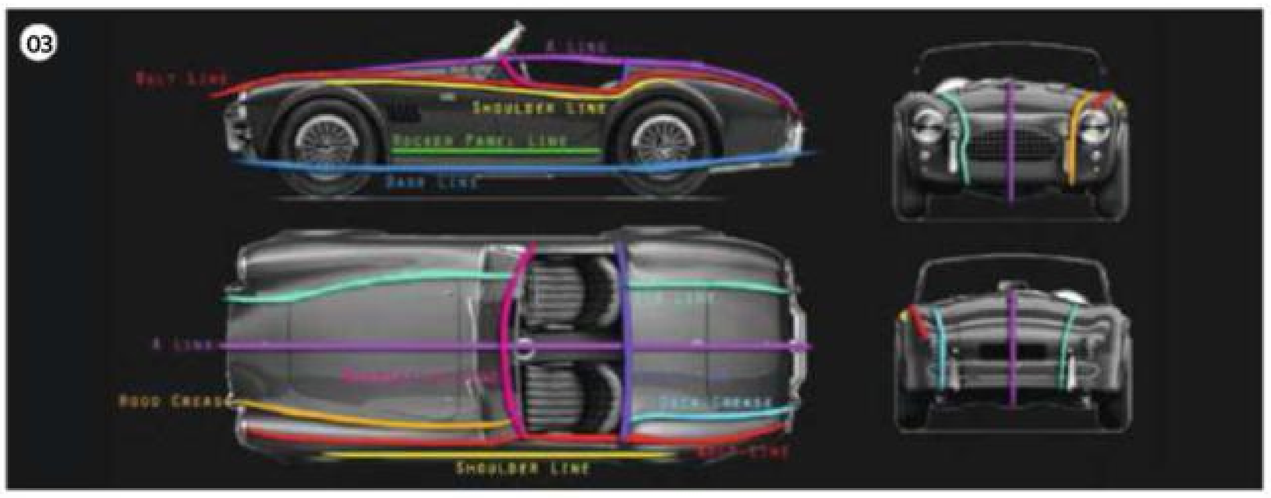
Make preparations

Gather blueprints and set up the scene

01 Collect reference We'll need two types of reference, starting with the turnarounds for the image planes, which will be our primary guides when creating our model. A great source for free vehicle turnarounds at excellent quality is The-Blueprints.com. Next we need an abundance of photo reference from many different angles and in a variety of environments. In the modelling phase, these will be helpful to fill in the perspective details that aren't clear in the turnarounds. These images will also give us a great understanding of the material properties of our surfaces.

02 Start your scene in Maya To avoid distortion when making image planes, the dimensions of each plane should be based on the resolution of the image it will be displaying. Once the textures have been applied and the image planes are lined up, just resize them to a real-world scale. You can find the real-world dimensions of this Cobra online, so set Maya's working units to inches and create a box with the same dimensions as the car. Rescale the references to match the values of the box and create a display layer for the planes.

03 Establish structure and the car design Before we start modelling, we'll identify the important lines that make up the body's design. These will give us a great starting framework for the body geometry. We'll be working with all the lines noted in the adjoining image, but let's define some of them here. The A-line runs over the car, tracing the silhouette from the front of the hood to the back of the trunk. The belt line runs from the headlight, through the bottom edge of the windows. The base line runs along the bottom of the car, from the very front to the very back.



About line structure

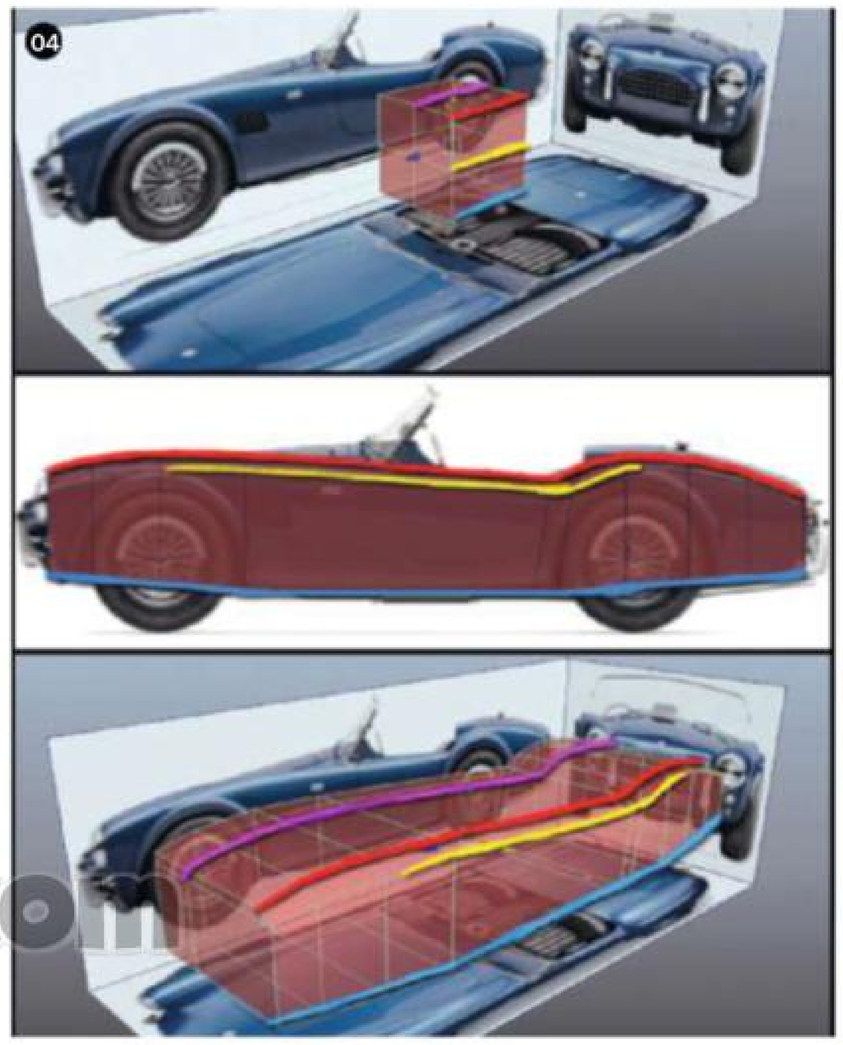
Structural lines can be seen on any modern car body design, though they can sometimes have different names. When modelling any car it's important to begin by establishing these lines because they act as markers for the body's key plane changes. By establishing this framework early on, we are left only with the simple task of polishing the spaces in between. For an apprentice modeller, I should note that the Shelby Cobra is a racer with a pretty unique line structure and particularly complex curvature. I've found more conventional car bodies are typically much easier to practise with.

Begin modelling

Establish the main forms of the car

04 Line up in the Side view Create a box with two vertical subdivisions, two horizontal subdivisions and one depth subdivision. In the Side view, the bottom edge of the box should line up with the base line of the car; the middle edge loop should line up with the shoulder line and the top edge should line up with the belt line of the car. At this stage simplicity is key, so strive to establish these lines accurately, but with a conservative use of vertical edge loops. Once these edges have been created in the Side view, just line them up in the Top view.

05 Adjust for the Top view In the Top view, the centre edge loop is the A-line, so delete the right-side geometry and work on the left side. Create an edge loop to make the hood and the deck crease and then make another edge loop to establish the rim line. We can line these edges up in the Top view as we create them. Make an edge for the windshield line and one for the deck line. With the lines in the Top view done, finish lining up in the Side and Perspective views.



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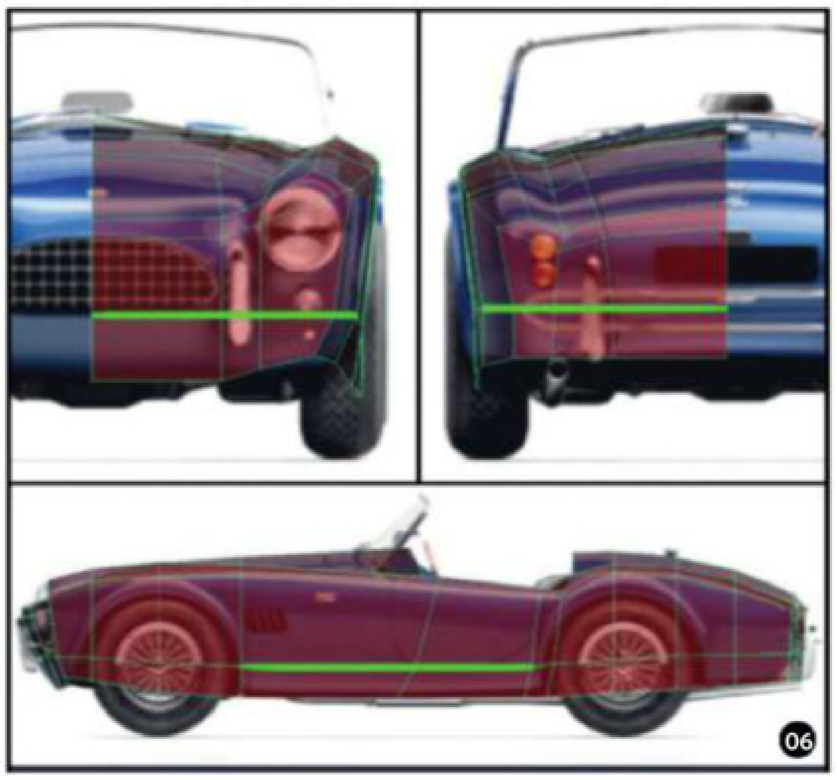
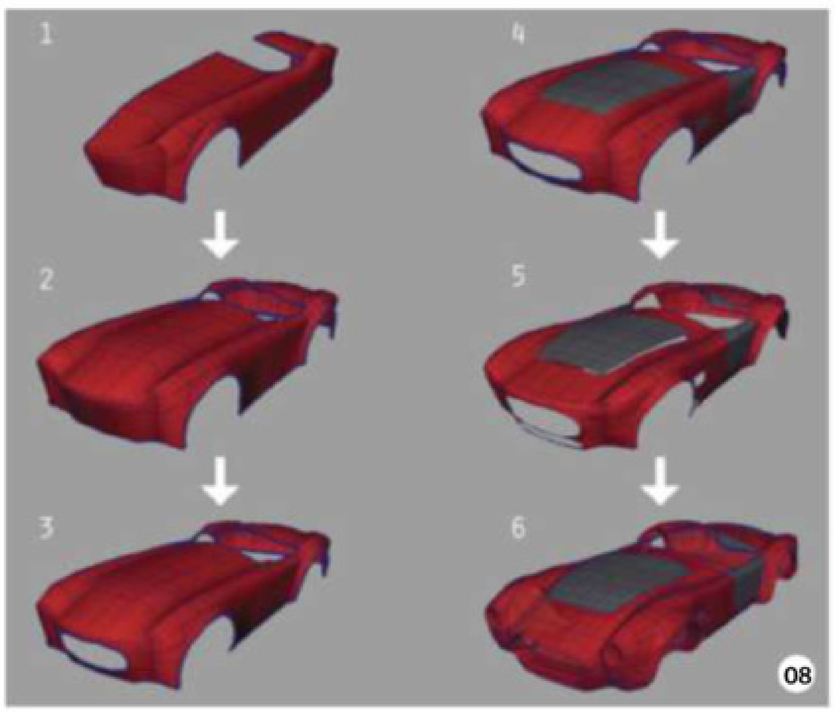
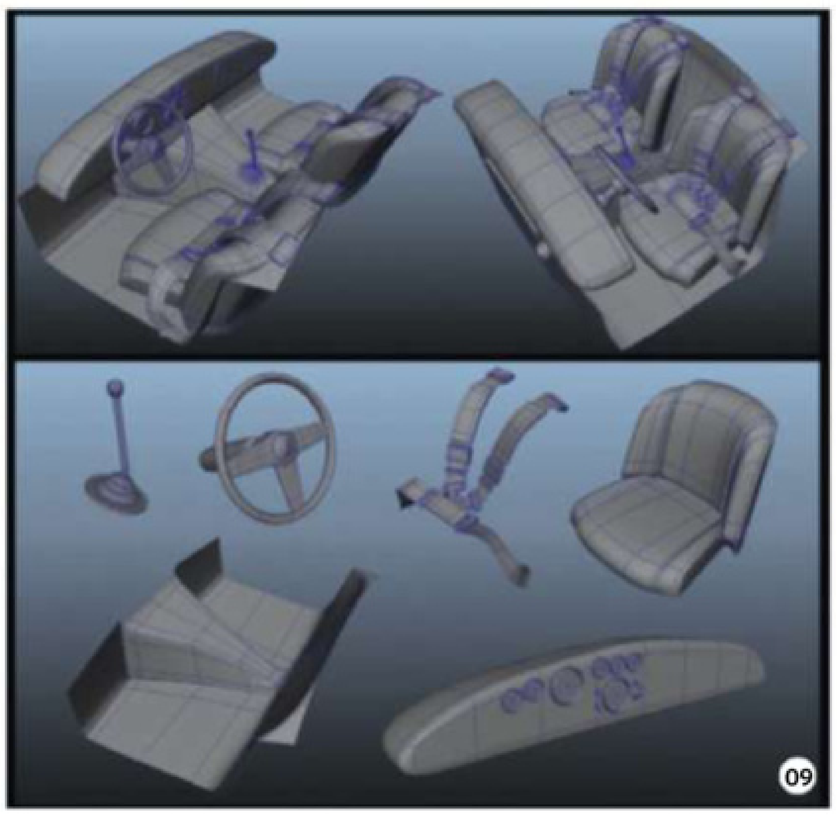
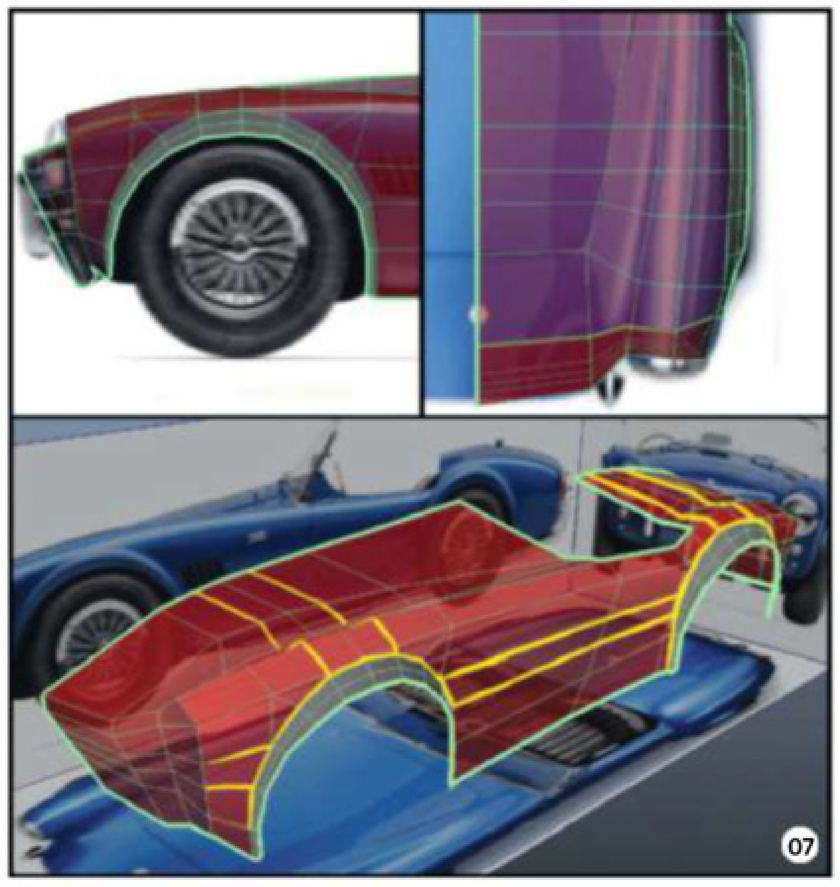






10 Add exterior accessories External elements can be a subtle but important factor in producing realism. Compared with the interior, these are more varied and numerous, but still very simple, so the same advice goes. Consider each piece, start with simple forms and use smoothing to get that final crispness. Because some of these pieces can be subtle, it's useful to comb through the reference images to make a list of all the accessories. Incorporating these small details can be critical in achieving realism.

06 Tweak the front and back For the front, we can use the edge loop from the shoulder line to make the top lip of the grill, then we'll create a second edge loop to create the lower lip of the grill. This new edge loop will also serve as the rocker panel line on the sides of the body, as well as the bottom rim of the trunk in the back of the body. Finally we can address the subtle taper that we see in the Front view, where the car is wider at the shoulder line and more narrow at the base.

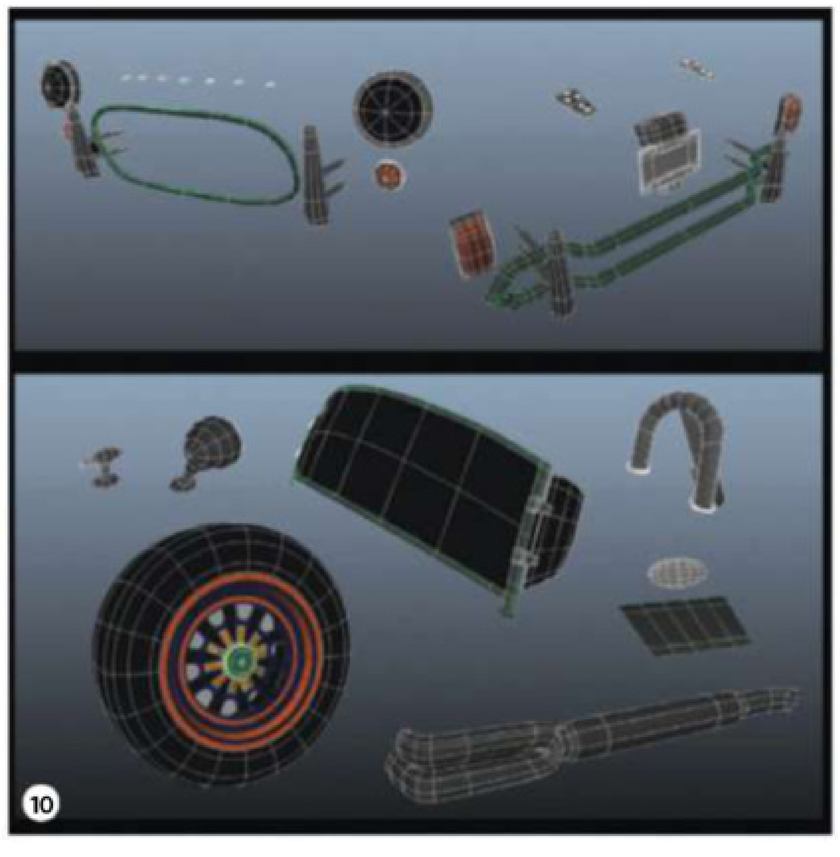


07 Model the Shelby's fenders

For the next step we need to create a cylinder with 20 axis subdivisions. Rotate it onto its side, delete the cap faces and rescale it to line up in the Side view. If we delete the eight faces along the bottom of the cylinder, we're left with a 12-face arc. Line this up in the Top view, using the two ends to establish the inner and outer rims of the fender. Next we need to merge the fender by adding four strategically placed edge loops to the body geometry and deleting any unnecessary faces. Repeat this process for the rear fender.

08 Refine the body With the key lines established, we can continue adding edge loops to help refine the geometry. First make any edges needed to extract the doors, hood, trunk and grills. Next we can focus on rounding out the surfaces between key lines. Maya's Sculpt Geometry tool is our friend in this step, but remember to keep it simple. Ultimately we'll be smoothing our geometry to get the finished roundness, so we only need enough mesh density to get our model looking polished in Preview Smooth mode.

09 Work on the interior The interior is comprised of a few large components and lots of small ones, all of which can be simplified and re-created with standard box modelling. Modelling these components can be quick and easy if we first reduce them to their basic forms. Analyse some of the larger components such as the cabin box, which is essentially the tub in which the interior sits. The dashboard is a rounded cube tucked under the windshield line and the seats are broad L shapes with soft edges. Start simple and remember that Preview Smooth can help provide that last level of polish.



Notes on modelling

Feel free to mix and match parts to create your favourite combination. Here I opted for bigger, more stylish fenders from a reference image. The Cobra has a one-piece body, but most modern car bodies are comprised of separate panels. If you're following along with one such car type, I would highly recommend breaking these panels up into separate meshes: front bumper, bonnet, front wing, quarter panel and so on. Also, name everything and keep the display layers, hypershade and outliner organised. Remember to delete any unneeded history and click Freeze Transformations on Geometry whenever appropriate. This should keep the scene neat, crash-free and far easier to work with.

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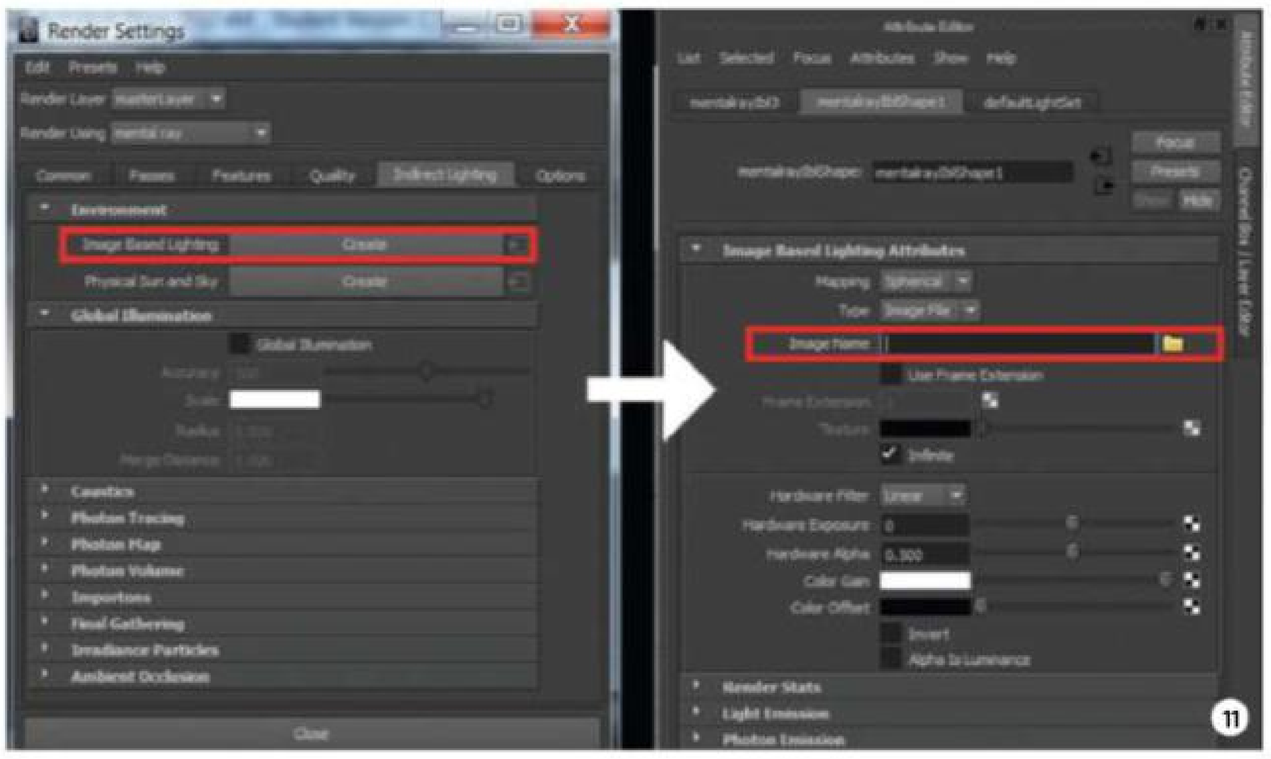
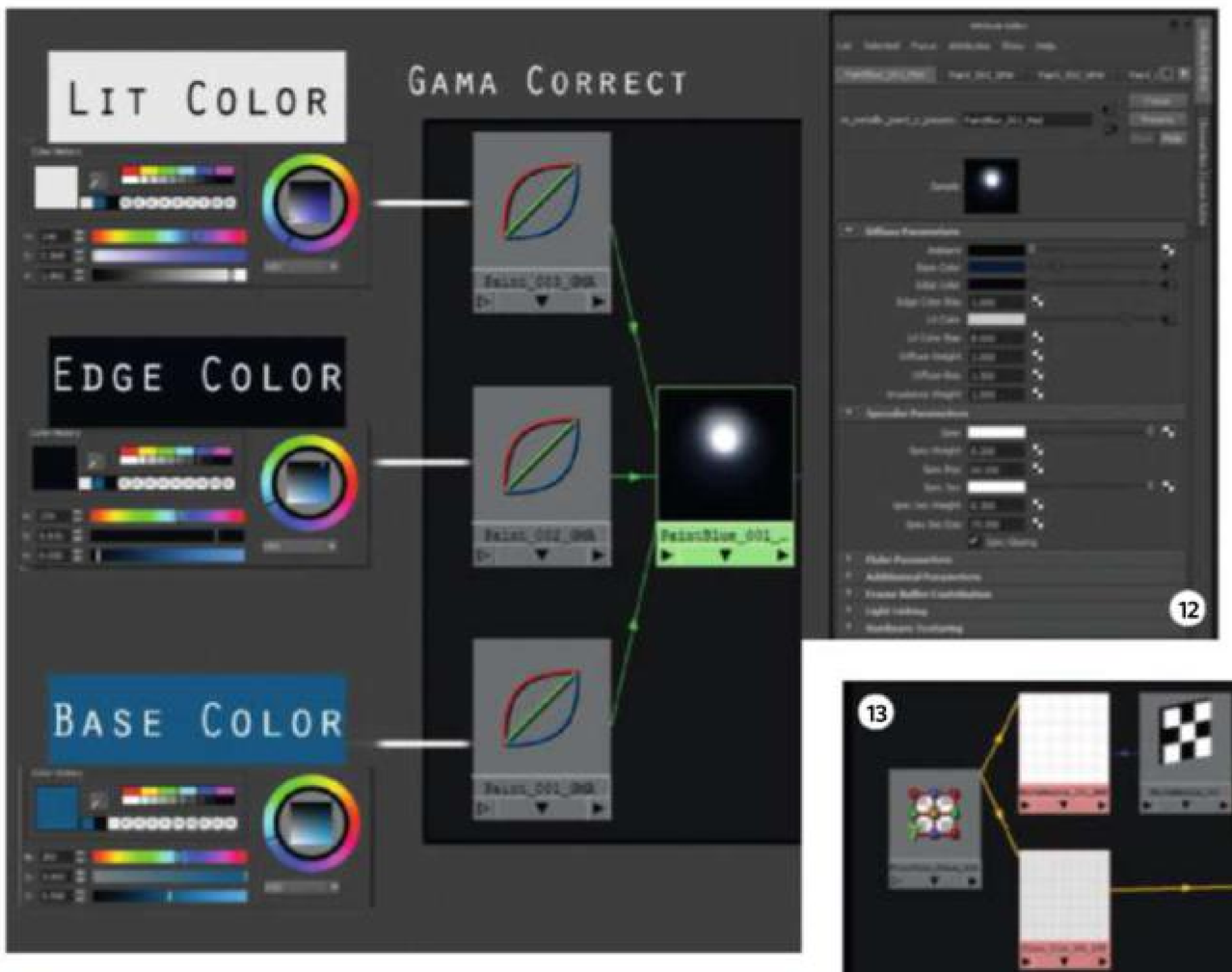
Work on materials and lighting

Use image-based lighting and form realistic car paint

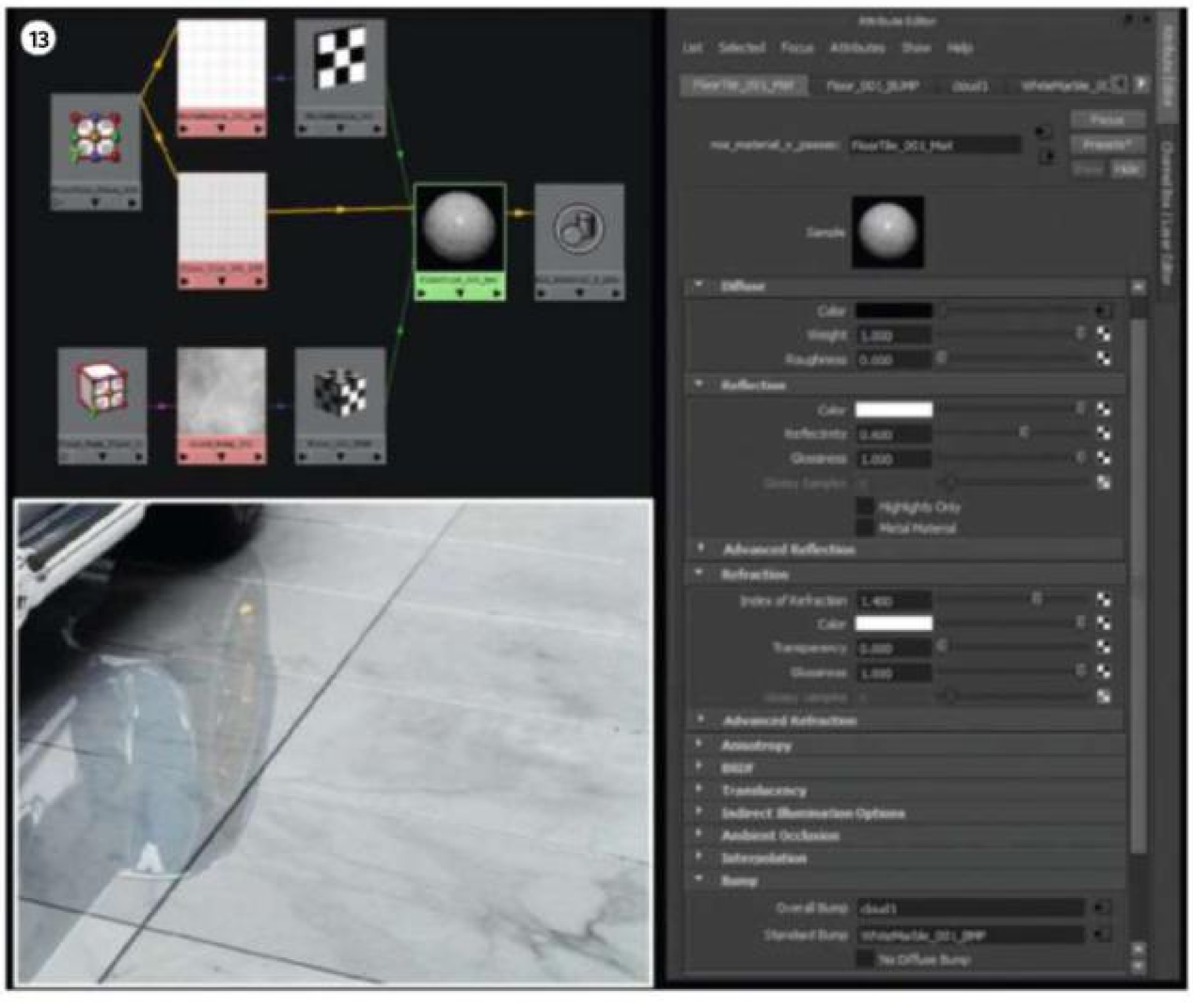




11 Set up image-based lighting First get a suitable HDR image – there are plenty of great and free sources for HDRIs online. For the vehicle lighting, an overall darker HDRI with a few crisp hotspots works well, so to set this up we simply need to go into our mental ray Render settings, under the Indirect Lighting tab, in the Environment dropdown menu. Click the Create button next to Image Based Lighting to create the IBL sphere around the scene. Now, with the IBL sphere selected, we can go into the Attribute Editor tab, move over to the IblShape node and plug in our HDR image.

12 Make the car paint material Mental ray comes with a powerful and simple shader designed to simulate real car paint: mi_car_paint_phen_x_passes. The Passes variant is best to use because it's compatible with mental ray's Passes system, which may be handy later. This shader can instantly give us some excellent results, but I also recommend experimenting with its many functions to see what other looks can be produced. Set the Base_color, then use Edge_Color and Lit_Color to simulate how car paint tones change as the surface curves away from the eye, or into direct light. The Bias value dictates how each colour blends into the Base_color.

13 Use other materials For this image, almost all the other materials were created using the versatile mia_material_x_passes, which is designed to realistically simulate virtually any surface type. It comes with a considerable library of attribute presets to quickly get an excellent starting point for any material. This shader is also worth studying in real depth, but for this tutorial we can only cover some of its basic functions. Starting with the available presets, just adjust and tweak the attributes to suit your needs and hone in on the perfect look for each surface.



How to get the best materials and lighting

Materials and lighting are disciplines in their own right, so we can't cover all of their intricacies in great depth here. Below are just some of the most important concepts that should be mentioned:

- Set up Color Management and a Linear Workflow to ensure that Maya is reading textures correctly, as well as displaying renders accurately.
- Increase the Final Gather Quality in the Indirect Lighting tab by increasing the filter. The Accuracy and Point Density control FG Rays and FG Points, producing higher lighting detail and fidelity.
- To properly render mia_material_x_passes materials, you should enable Output Maya 2009 Passes in the Advanced dropdown menu.

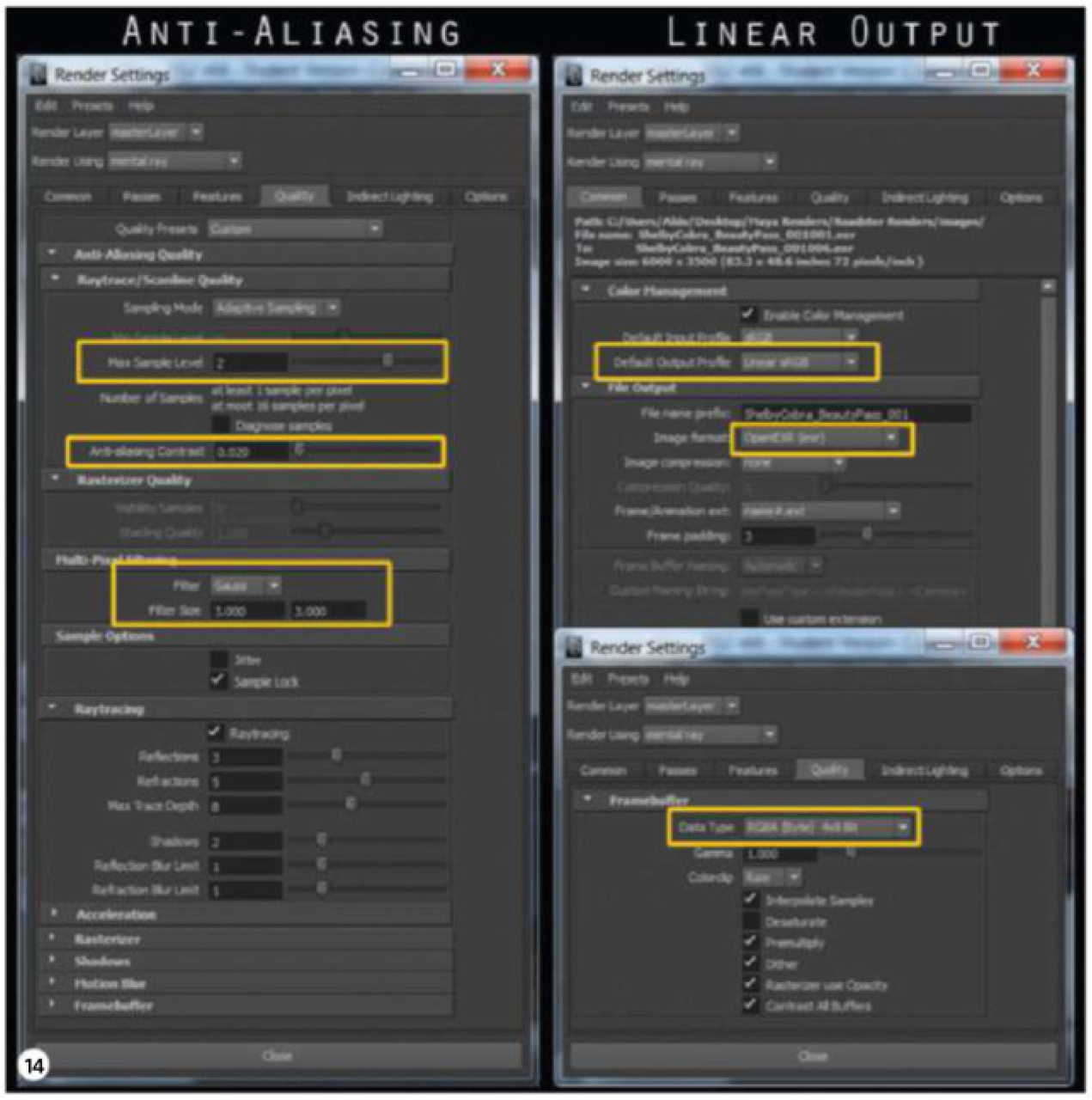
Start the render

Adjust your render settings and make initial passes

14 Tweak the quality settings It's common practise to adjust final settings near the end of a workflow, because they can significantly increase the render time when you come to finishing. You can clear up aliasing artefacts in Render Settings>Quality>Raytrace/Scanline Quality. Select Increase Max Sample Level, lower the Anti-aliasing Contrast and adjust the Multi-Pixel Filter. You'll also want to render in a linear format to provide the most control for post-production enhancements and compositing. Set the Default Output Profile as Linear sRGB and use an HDR or OpenEXR Image format. In the Quality tab, go to Framebuffer>DataType and use the RGBA (Float) 4 x 32 Bit.

15 The Beauty passes Commonly you would layer reflections, shadows and refractions on the Diffuse pass, but for this image the Beauty pass has been used as the base for the final composite. Render out the full image with all the visual information on a single layer. It's also good to create isolated Beauty passes for the car, the floor and the background. This can provide individual control over each object in the Beauty pass. Do this by simply turning off Primary Visibility in the Shape Render Stats for unneeded objects.

16 The Reflection passes The body, chrome accessories and white marble floor are all heavily reflective surfaces, so you need to create a variety of Reflection passes to work with in the compositing phase. Again, it's useful to have a full Scene pass, in addition to Isolation passes of the car and the floor. Of course, it's best to use mental ray's Passes system for this, but in some cases it can be advantageous to create a different kind of Reflection pass. Try coating the target geometry with a fully reflective architectural material to provide an alternate type of Reflection pass with very strong, fully opaque reflections.



Make the right passes

- The Passes tab enables us to render many passes at once. It's quick, easy to use and extremely helpful. It's capable of much more than we can cover here, so it's definitely worth looking into and experimenting with.
- I also recommend studying different practical methods for creating various passes. Make tests to create unique or custom types of passes that can be a lot of fun, provide alternate visual controls and give your image a unique visual element.
- We can copy the Depth pass in Photoshop into an Alpha channel and then use it with the Lens Blur filter to quickly create a realistic depth of field effect.

Composite the passes

Bring all your render passes together in Photoshop

17 Experiment with passes For this project we're compositing on top of a Beauty pass, so we don't absolutely need all the different types of passes, but a complete set can be a powerful tool for enhancing the visual quality of the final image. Having an abundance of different passes to work with is always advisable, even if some end up being discarded. This way you can experiment with a bunch of different passes, adjustments and blending modes to see what looks the most effective. In addition to the Beauty and Reflection passes, Specular, Shadow, Ambient Occlusion, Depth and Diffuse passes have also been used here.

18 Composite your passes Open Photoshop and copy your various passes into a single PSD. Take the full Beauty pass, place it at the bottom of the layer stack, then put the Diffuse pass directly over the Beauty with a low opacity setting. You can adjust its opacity or apply a layer mask to control how the elements in the Beauty pass show through. Finally, take all the other passes and set their blending mode to Linear Dodge (Add). Now that you have our PSD set up to provide full control over each element of the image, you can start enhancing everything.

19 Make final touches At this point we're still striving for realism, but with a focus on visual interest and appeal, such as a photograph enhanced for advertising. You can use your artistic judgement to fine-tune the colours and other elements accordingly. Focus on increasing the value range to put duller darks with brighter whites and boost the saturation on the body. Also, try creating subtle photographic effects such as a vignette and a shallow depth of field. This is your final pass at enhancing the image, so take your time and experiment with different blends and passes.

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Sofian Moumene works as a lead CG artist at Carioca Studio in Bucharest, Romania

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Artist info

Sofian Moumene

Personal portfolio site
www.sofianmoumene.com

Country Romania

Software used 3ds Max, V-Ray, Marvelous Designer, Photoshop

Expertise 3D and advertising illustration for a variety of commercial projects

The purpose of this tutorial is to create a photorealistic still life scene from scratch. We'll start with modelling the various organic and non-organic objects and then move on to building detailed shaders. We'll be using 3ds Max for the base modelling and ZBrush for detailing and texturing. Marvelous Designer will also have a role in simulating the drape in the scene, and finally Photoshop will be used for some post-production touches. We'll be using ZBrush's Spotlight to texture the various fruit in the scene, which is a great tool for eliminating any troublesome UV seams.

Concept

For this project I wanted to illustrate a feeling of relaxation and warmth – something that you get on a vacation or a long, lazy afternoon.

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Sketch out your composition

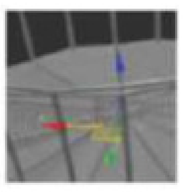
Organise your essential starting materials

01 Search for reference images You can use Google to find free images, or Shutterstock for high-res and high-quality photographs. These will aid you when it comes to detailing the shaders as accurately as possible. This is an important step as you need to be clear about the direction for the materials you're using, as well as the overall design of your assets.

02 Complete rough sketches With all reference images gathered, a clearer image of the whole scene should start to take shape in your mind. You can then start to make some very rough sketches in Photoshop based on your early ideas. Also try making some basic shapes in 3ds Max and quickly arrange them to figure out the composition. This is also the step where you can create your camera and decide on the viewing angle. Of course, many things will likely end up different in your final render, but this stage will still help you to establish some broad, foundational ideas.

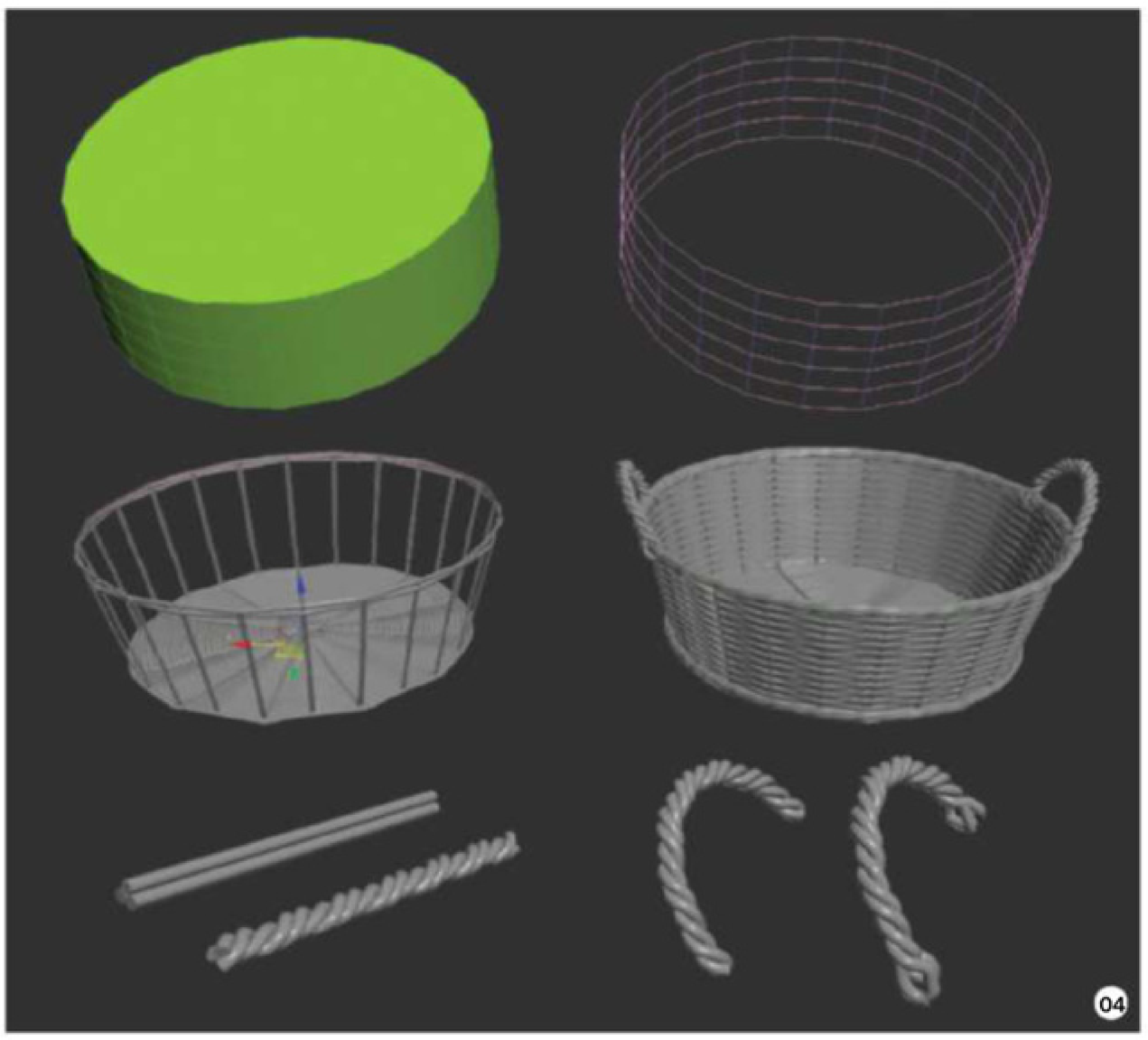
The Marvelous Designer drape

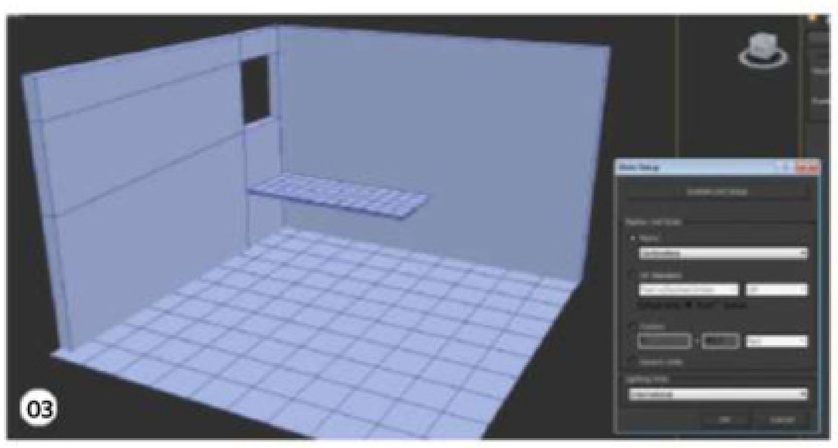
The drape you see here was simulated in Marvelous Designer, which is great for creating different types of cloth. I exported the objects that I knew would interact with the drape from 3ds Max in DAE format. This included the background wall, the table and the ceramic wine pot. Next I created a rectangular sheet of cloth in Marvelous Designer, at 200 x 80cm. I clicked on the red Sync button to synchronise the 2D viewport with the 3D one. This way, if I modified something in 2D it would be visible in the 3D version as well. I went to Environment>Gizmo>World Co-ordinates Gizmo in the top toolbar to change the object axis in a more controllable mode. Next I moved the cloth above the imported objects and pushed the Simulate button to see the cloth falling on the objects. I started pulling and arranging the cloth as I wanted in order to get a pleasant shape, then selected the cloth and lowered the value for Particle Distance from the right-side Properties menu to get a more detailed mesh for the cloth. I exported the resulting mesh as an OBJ and imported it in ZBrush to retopologise it with the QRemesher, because the mesh from Marvelous Designer had jagged edges. I quickly applied QRemesher with the Same option ticked so I got a similar number of polygons after the remeshing. I also made a UV with UV Master and exported the mesh in 3ds Max.



Start modelling

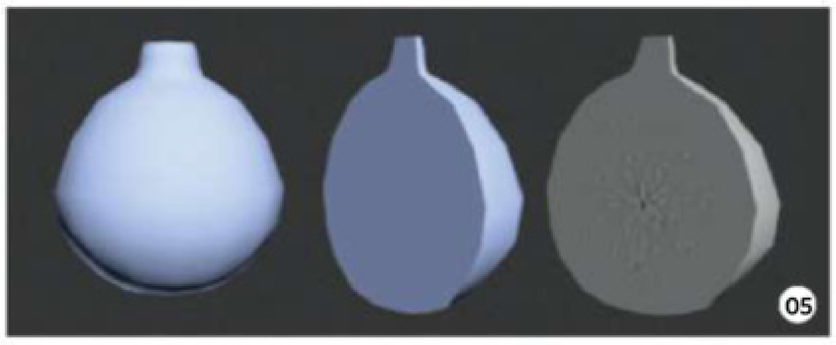
Use a variety of tools to model objects

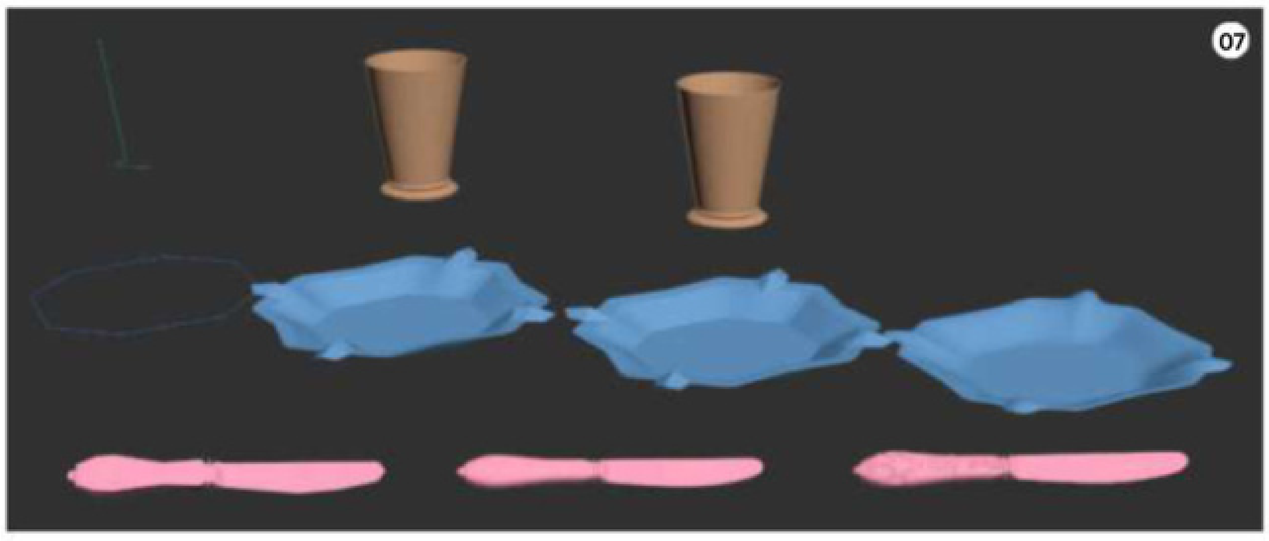


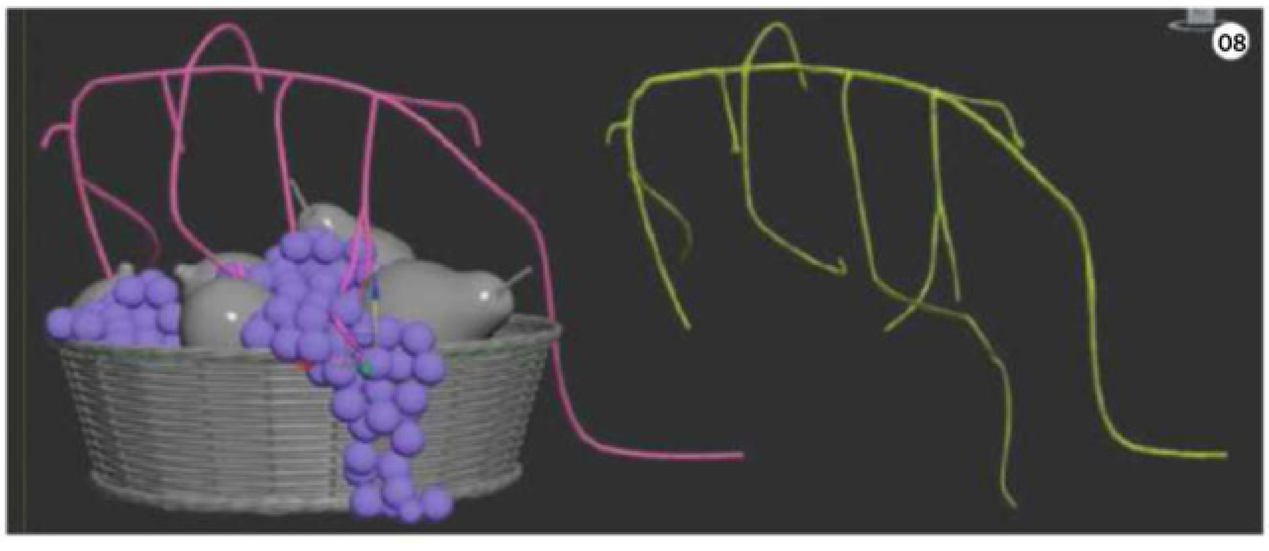


03 Work on the room Use real-world scale for the whole scene and build just two walls – one in the front to form the background of the still-life subject and the one on the left, where you can also put a small window to use as the main light source. The floor isn't visible in the final image, but it's important to include it to obtain more natural light bounces.

04 Shape the wicker basket For this element, start by creating a cylinder (Radius: 18cm, 24 sides and 5 segments). Add an editable poly, select the vertical edge loops, as well as one horizontal edge loop, and convert them into splines. Make a shape as the cross-section of the wicker strand and use the splines you just added as a path with Loft active (Create>Compound>Objects>Loft) to define the volume of the wicker. Make another copy, vary both the wicker strands and then clone them to create the walls of the wicker basket and the bottom part. Select the walls and the bottom region and apply an FFD (2x2x2) modifier to give them a conical shape. You can create the basket's handles by adding a Twist modifier to three splines, then a Bend modifier. Finally, edit these with and Edit Spline modifier to fit the rest of the wicker basket.







Modelling with layers

One of the reasons I love 3ds Max is because I can model almost anything using modifiers as layers. I always keep as many of the modifiers as I can use without collapsing them to editable polys. This way I have access to the layered history of the steps I used to reach a certain shape. Of course, it's not great to have too many modifiers in the stack, because you can end up using too much RAM, but keeping the vital ones can be a great help.

05 Make the figs For the figs you should use the references you gathered in step one, paying close attention to them as you model. Start drawing the contour on the reference image with the Line tool and use the Lathe option to convert it into a 3D shape. Next, apply an Edit Poly to refine the shape and make two versions of the fig – one cut in half and one whole. After this step is done, just grab the unwrapped UVs and export them as OBJs to ZBrush to create the tiny details. These can be used later back in 3ds Max as Displacement maps. In ZBrush you can use the Spotlight tool to project a photo of half a fig on the 3D model and then apply the Mask by Intensity option from the Masking dropdown menu. To finish this step, grab the Inflate brush, paint the unmasked areas of the fig and replicate all the details from the reference. Clear the mask and sculpt in some extra details where needed.

06 Add the pear To model the pear, you can use the same workflow as for the figs: first drawing half of the pear in 3ds Max with the Line tool, then applying the Lathe option to convert it into a 3D shape. Again, you can refine the fruit's shape with an Edit Poly modifier and at the end make it into a UV. In ZBrush, paint the textures (which can also be used for the shading process) and then use the masking tools in ZBrush to achieve the finer details and shape.

07 Bring in the plates and cutlery To model these objects you can apply basic techniques with the Knife tool, using an Edit Poly to model the rough shape, then importing it into ZBrush. Add the details such as little bumps and scratches, as well as the decorative patterns from a vector pattern (made in Illustrator, for instance). For the plate, you can apply the same process, sculpting in the details by hand. For the cup, grab the Line tool to draw the outline and then use Lathe and Edit Poly to refine the shape a little. Find some decorative vector patterns from Shutterstock that you like and then paint the UVs in Photoshop to get a Displacement map.

08 Create the grapes Modelling the grapes is more complex due to the amount of objects. First block out the shape of the cluster of grapes by making a sphere and cloning it out as instances, so when you modify one, the change applies to all of them at once. Once you get a shape you like, add a Noise modifier with very subtle intensity and a Squeeze modifier to stretch the spheres a little. You can also start to make the leaves from a photograph. There are different approaches to this, with the simpler method being to use an Alpha map of the leaf and texturing a plane with the Noise modifier. However, as this is a relatively close-up shot you need to really convey the thickness of the leaf. So, draw the outline of the leaf with the Line tool in 3ds Max and then apply an Edit Poly modifier. You can also insert a Subdivide modifier to increase the poly count without encountering any of the problems that TurboSmooth causes when you use it with an uneven poly flow.

09 Finish the grapes element Next, apply the Shell and TurboSmooth modifiers, as well as the Bend and Noise modifiers to add more details. Next, model the stems by drawing them with the Line tool in 3ds Max and giving them a slight amount of thickness. Export the mesh to ZBrush and use DynaMesh to make it into a single continuous mesh. Sculpt all the details you wish and create the UVs with UV Master. Export it back to 3ds Max.

10 Model the glass and ceramic wine canister For this, you'll once again need to use the Line tool for the outlining, along with the Lathe modifier. Add another Edit Poly modifier to model the handle and the neck of the canister. Apply the TurboSmooth and Noise modifiers to add some small imperfections to the glass. For the ceramic canister, use the same method but at the end add a Displacement map to mimic the horizontal marks left on the clay.

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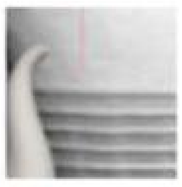


Light the scene

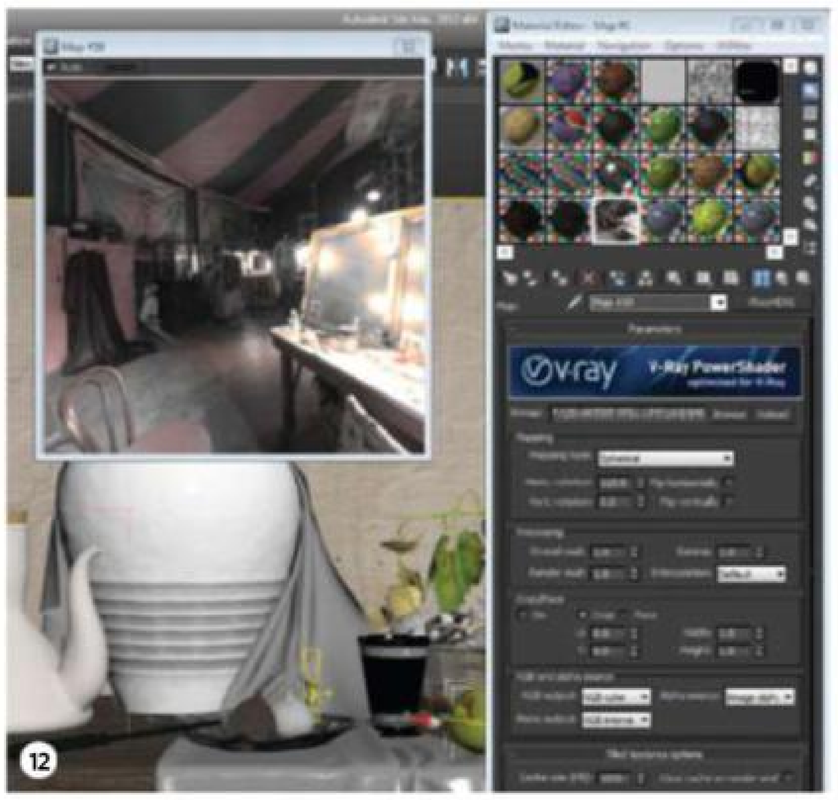
Experiment with HDRIs and settings

11 Lighting test It's a good idea to complete some different experiments with various HDRIs for the reflections and lighting. As we know that the main light source is coming from the little window in the upper-left corner that was made during the modelling process, we just have to find the right HDRI for the reflections.

12 Define the light sources Try to avoid filling the scene with lights and use as few light sources in the scene as you can. In this example, only two V-Ray Dome lights coupled with an HDRI and a V-Ray rectangular light have been used. When you've decided on which HDRI to insert, just create a V-Ray light source and select the Dome type, load the slot with the chosen HDRI and then experiment with the Intensity multiplier. As we don't need the light from the HDRI, just the reflections, we can deselect Affect Diffuse from the option's rollout. Now move to the exterior of the room, just outside of the small window on the left of the scene, and try making a plane-type V-Ray light as the main light source. Experiment a little with the position and intensity to quickly find a satisfying result that looks natural.

Create drops with MultiScatter

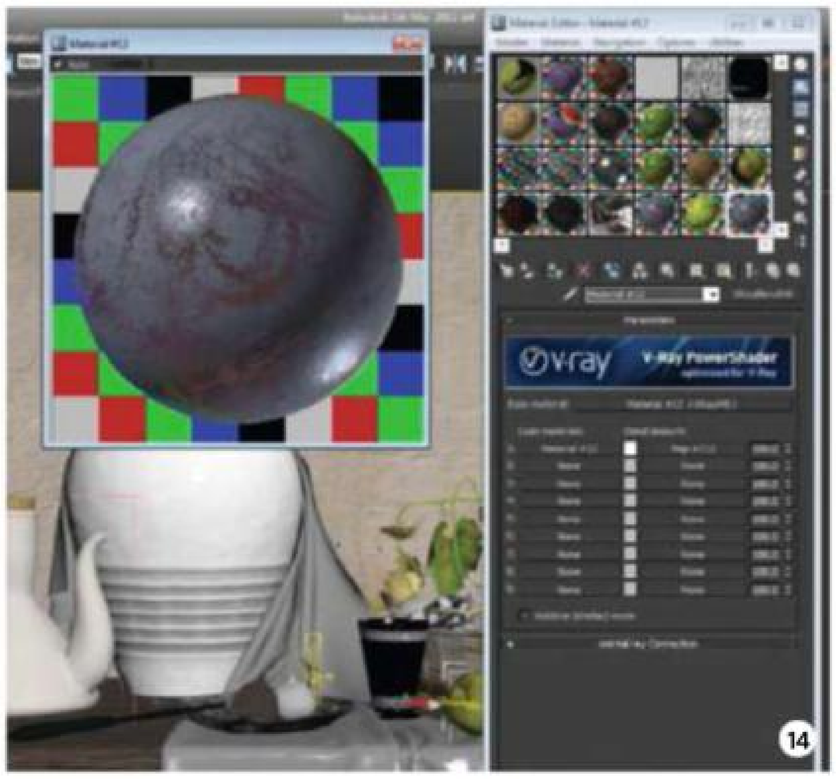
Later, near the end of the creation process, I decided to make the fruits a little wet to give them a more lifelike appearance. To do this I simply used the MultiScatter plug-in for 3ds Max to scatter some water droplets on the fruits in the basket. I first modelled a few simple drop shapes, using some photos I found on Google, then I used four MultiScatter objects to distribute them on the various fruits.



Texture and shade

Use ZBrush's powerful texturing tools

13 Texture the figs and pears This is the first stage where we'll take advantage of ZBrush's Spotlight tool for texturing. First download some high-res photos of cut-in-half figs and whole figs, then start projecting with Spotlight onto the 3D model. Here the 3D fig model was subdivided into around three-million polys to obtain a crisp texture, because the resolution of the PolyPaint depended on the number of polygons. The best part of the Spotlight feature for texturing is that you don't have to worry about the seams. Next, transfer PolyPaint to the texture by going to the Texture Map rollout and using New from the PolyPaint option. You can texture the pear using a similar process. The shader for the cut-in-half fig here was VraySSS2 along with the potato preset, because it's close to the result we want to achieve once the scale has been altered. For the pear, a simple VrayMtl was added with the Translucency set to Hard Wax, with some Bump and Translucency maps made from the Diffuse map in ZBrush.



14 Make the grape shader To create the shader for the grapes, you can simply apply a V-Ray Blend material and combine it with two VRayMtls. The first layer you can see here was matte, opaque and with a lighter colour. The second layer has a more glossy and translucent finish. Try mixing this with a dust-like texture map, which you can download from Shutterstock, or another resource site.

15 Build the shader for the glass container To finish the glass container, first make a simple glass material. Here a VRayMtl was used with a little greenish fog (Fog Multiplier = 0.15) and for the dusty effect another dust texture was loaded into the Refract slot with a value of 20. You can also add a Bump texture to obtain some finer details, enhancing the imperfections of the glass. The ceramic canister material can be achieved by creating another VrayMtl and setting the Diffuse and Fog colours to reddish hues, with the Fog Multiplier set to 0.1.

16 Finish with a metal shader Make one version of a metal shader and then modify it according to each object (plate, cup, knife). Extract lots of ambient occlusion and Cavity maps from ZBrush using the Multimap Exporter, then use these to blend the different materials with the help of a V-Ray Blend material to create the dirt in the small details on the plate and knife. Try mixing several textures in a Composite map to finish the cup.

Work in reverse

In my opinion the best way to learn something is to reverse-engineer it. Supplied with this issue you have the full scene at your disposal, so study the shaders, textures and the models. If you have any questions please don't hesitate to contact me.

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I made this...

Incredible 3D artists take us behind their artwork

Artist info

Benjamin Erdt

Website www.ben-erdt.de
Country Netherlands
Software used Maya, ZBrush, MARI, MODO, Photoshop
Bio Ben Erdt is a professional artist currently living in Amsterdam and working at Guerrilla Games

“When finding shape, form and silhouette I mostly use pen and paper. Once I have a design that has potential I scan it and bring it into Photoshop for colouration or more iterations. Sometimes I jump straight into ZBrush to sketch the design in 3D – that’s what ZBrush is so great for”

Shrieker 2013

I love designing creatures and thinking about how they evolved, how they see, behave and live in their environment. This time, I wanted to design a tree-dwelling creature with nature as my main inspiration.

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Modular textures in MODO

Step by step

Easy-to-follow guides take you from concept to the final render

The Watchtower 2013

> Create a fast and efficient real-time environment using modular textures

Tor Frick is a 3D generalist, working with everything from characters and environments to shaders and pipeline design

Over the following pages I'll showcase my workflow for developing a modular environment. First I'll go through the basics, such as blocking out the environment, analysing what to build and how, and how to design and create modular textures. I'm using MODO and UDK here, but the workflows aren't application-specific. I will also briefly show how my modelling pipeline looks, both for modular textures as well as high-poly objects. Later I will discuss how to assemble the various elements, finalise the scene, and how to use shaders and detail meshes to mask the modular nature of the scene. The end result is a scene that is easy to create and can be readily expanded upon.

Artist info

Tor Frick

Personal portfolio site www.torfrick.com
Country Sweden
Software used MODO, Photoshop, UDK
Expertise 3D generalist, with a focus on hard-surface modelling and environments

What is a modular texture?

A modular texture is a texture consisting of several different elements and shapes, which can be combined together and reused for a number of different assets. Modular textures are most commonly used for sets of environment assets that do not require custom detail, but still need more structure than a tiling texture, such as architectural elements. The more variety you can create with a modular texture the more powerful it is. They are most commonly used in real-time game development.

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With the Disc

Tutorial files:

- A tower asset OBJ file
- A selection of modular textures for your project
- Tutorial screenshots

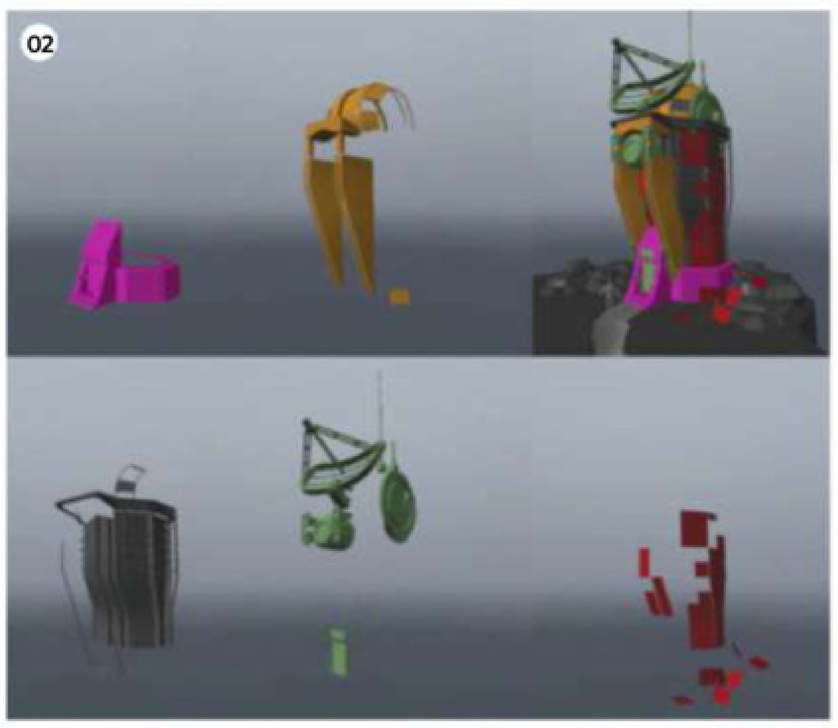
Learn how to

- Quickly and efficiently create modular scenes
- Design modular textures
- Reuse content in a scene
- Use blending for greater texture recycling

Build the blockout

Block it out and break it down

01 Start with a basic shape I start by blocking out the rough, basic shapes of the model. There is quite a lot of iteration required on these main shapes until I get something that I think will read well. Once I have the main shapes locked down I do a blockout of some of the mid-sized shapes to see what kinds of details I'll need, such as the antenna and entranceway. At this stage it's also a good idea to get a mental picture of what will be needed from the textures, as it really helps to plan ahead when producing a modular asset like this.



02 Divide modular and unique areas With the blockout of the model complete, I visualise what materials I'll be using and which need to be unique. For the base of the tower I want to use concrete, while the rest is metal. The majority of the tower will be easy to create with metal trims and plates, but some of the more complex areas will benefit from unique textures, such as the antenna and the rounded shapes, as well as the door for the entrance. I colour-code the segments in the blockout for an easy overview.

03 Analyse what's needed in modular textures Some of the materials have a clear separation, such as the concrete foundation, which is an isolated part, so having the concrete all by itself will work fine. For the metal surfaces it's a bit harder. The trick is to distribute the details and features correctly between the textures, so that you can get as much as possible out of them. The metal plates for the shell are also easy to separate into their own texture. Here I'll divide the rest of the metal into two textures, one for metal plating and one for trims and details. The details will be baked down from high-poly to low-poly, but since I will be using them with a modular texture, I'll put them on the same sheet.

Quick hard-surface sculpting

In order to make the textures pop a bit more, without introducing too many additional steps in my pipeline, I use MODO's sculpting tools to add basic detail sculpting on the hard-surface textures. They don't offer the same power as ZBrush or 3D-Coat, but since the tools are non-destructive and work on top of your Sub-D mesh, they're great for a quick damage pass. I use it a lot for features such as complex machinery, where you don't want to bring the whole thing over to a sculpting app but still want to achieve a slightly worn surface.

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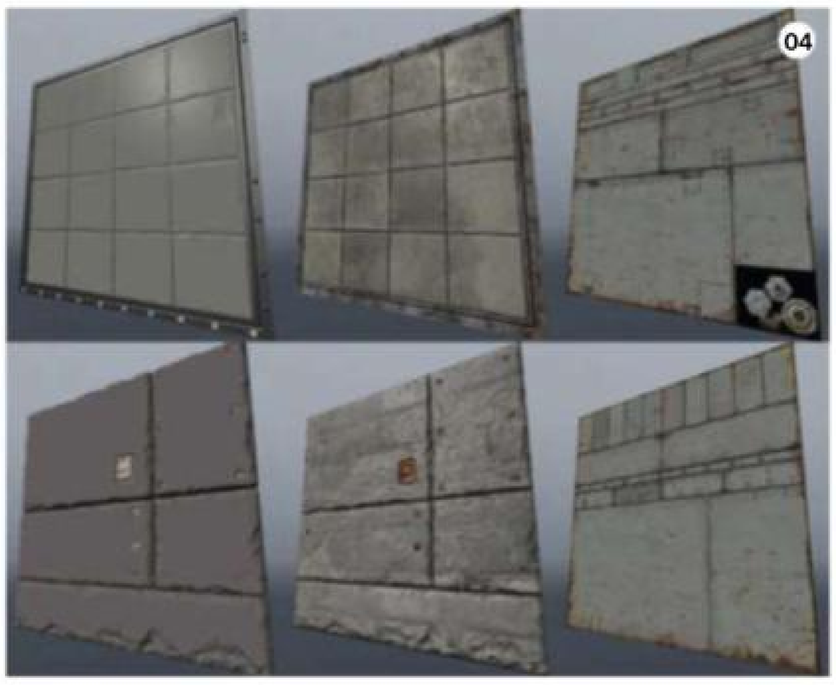
Create the main tower

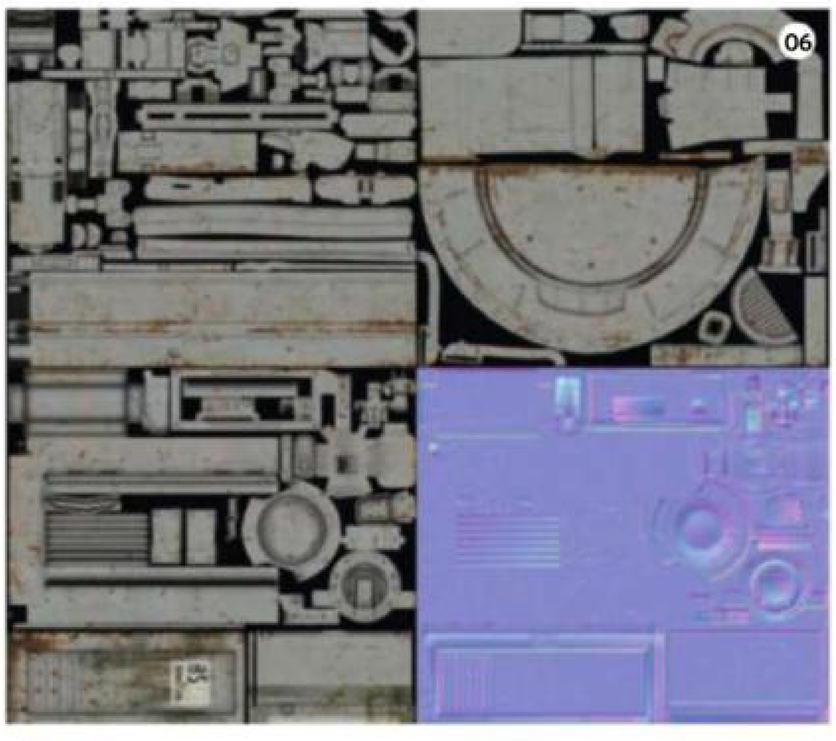
Construct the various elements and assemble in UDK

04 Work on the modular textures For every modular texture, I make sure that I have all the areas I need covered by that texture and lay it out efficiently. For the concrete I just divide it up into different square pieces that will work with most shapes. The same goes for the metal plates. For the hull I make sure that I fit a small trim in for the side profile of the plates. It's important to tile the trim/detail texture efficiently, since trims tend to be quite long. It's also a good idea to reserve some extra space in case you feel you need to include additional detail later on.



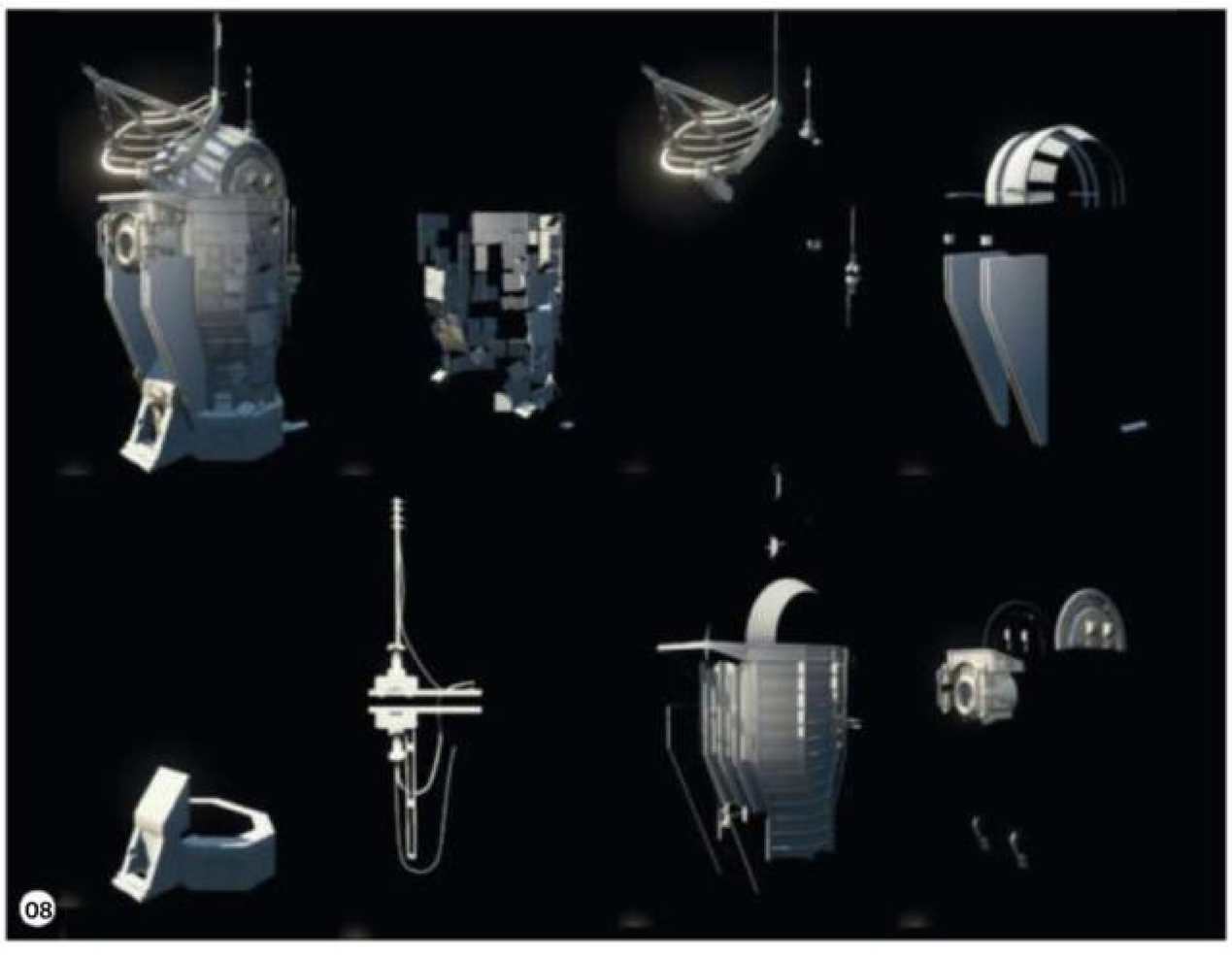
05 Start building unique elements The main reason for including discrete, unique elements is they should be areas that can't be made quite so well with modular textures. As such I make sure I use shapes and details that require custom textures. I use a lot of floaters when I build high-polys and even try to get away with as little subdivision modelling as I can. I mirror all the unique stuff as aggressively as possible, since I plan to cover that with vertex painting later, saving both time and texture space.

06 Texture the unique pieces The textures for the unique elements are basic, so I keep them relatively clean, since I'm adding extra paint and rust in the shader. I want a uniform and generic metal to be then mirrored and reused, so I use the same template for all the unique textures. I mostly add some small text and decals and add the texture as a base for an overlay normal on top of the baked one.



07 Map the modular textures When creating a modular environment, a lot of the time will be spent making UVs. I try to save as much time as possible. For instance I might unwrap one of the plates first, then as I copy them out to create the hull I'll shift the UVs around so that I get good usage out of the texture. The same goes for circular shapes. I unwrap one circle first and cut that into pieces, so all the UVs are almost finished from the start.

08 Assemble the tower Now I assemble the main tower in pieces per material, instead of one object with multiple materials, so that it will be faster to update the individual parts without breaking the rest. Additional small parts that can be used several times are added as separate objects, so I can reuse them with greater ease and give them unique shaders.



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09 Make the shaders I opt for the relatively expensive shaders, going for looks and speed more than pure performance. For all the metal, I go with a pretty complex vertex-blending material, where I can scrub off the paint and add rust with two separate channels. No specific blend masks are needed for this, I just use the Diffuse texture, since the ambient occlusion and rust in them work as a natural blend. The last thing to be added is a cracked Normal/Blend texture to make the paint-flaking more realistic. I also experiment with the parameters as much as I can so that the shader can be more controllable with instancing.

10 Paint the tower Since all the materials are based on the same master shader, I can easily tweak colours in real-time until I find something I'm happy with. After tweaking the colours I start using the vertex painting to scrape off paint in natural locations and add rust in areas where you might expect it. Make sure you paint all the mirrored surfaces to distinguish them as much as possible from one another. You can get away with a lot of very aggressive reuse of textures as long as you hide it with clever UVs and mask the different variants.

Modularity for speed

Don't be afraid to overuse modular textures. It's better to use them too much and then replace the parts that don't work with unique ones, rather than wasting effort building unique assets that later turn out to be a waste of time because they were not actually that important. Using modular textures is fast and the time you save enables you to give more attention the big picture and the parts that actually matter.

Artist showcase

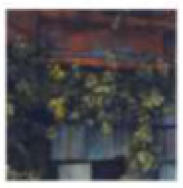
Tor Frick

I am 28-year-old 3D artist, currently residing in Uppsala, Sweden. I am a 3D generalist, as there is no single aspect of making 3D that I enjoy more than the other, which is why I have chosen to do a bit of everything.

***Baroque mansion*, MODO, UDK, Photoshop (2013)**
Part of a real-time baroque mansion I made in UDK. The project started out as a really small baroque corner and then just exploded into an entire scene.

***Modular Lab* MODO, UDK, Photoshop (2011)**
This is a still shot from an experiment in modular textures, where I created an entire environment using only one or two 256 x 512 textures.

***Datacore* MODO, UDK, Photoshop (2011)**
This is a small environment I built using mainly modular textures in UDK. I wanted to go for a cleaner look. In total the scene uses 69,000 triangles.



Add finer details

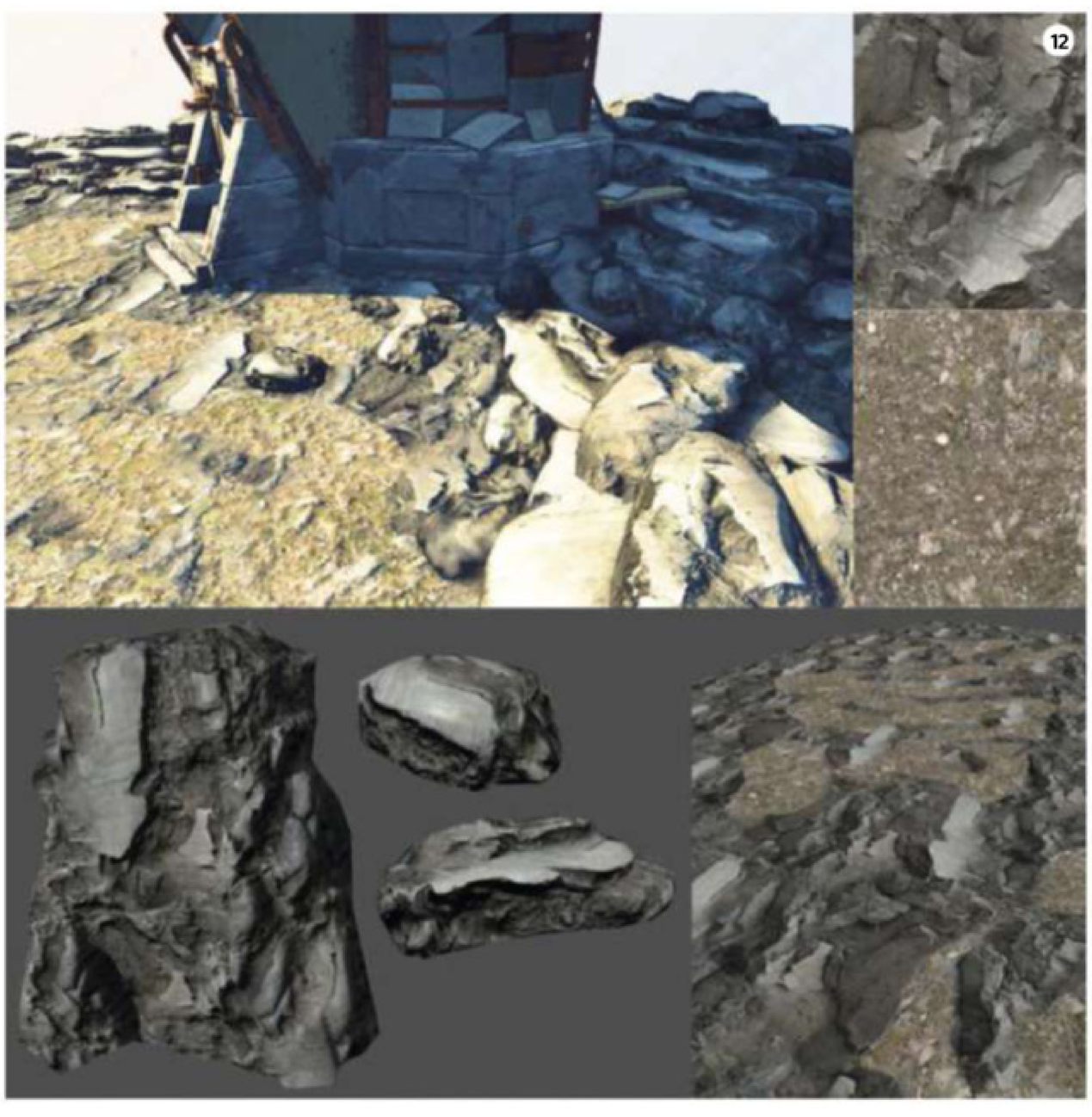
Decals, vegetation and rock will add realism

11 Add decals This scene is pretty sparse when it comes to decals, since the majority of the environment is organic. I'll use two decals, one giant number for the tower and a simple rust decal, which can also be created using shaders if you're willing to put in the work. Decals are a great way to bring in a sense of narrative to the environment, but in a practical sense they can also be used to cover up unnatural-looking surfaces or hide repetition.

12 Build out the ground area For the next stage I can use my blockout as a base and clean it up a bit, redoing the topology so I have an even distribution of polygons to help with the vertex-blending of the ground textures. Without a good topology it's all too easy to end up with unnatural-looking blends if you're not careful. For this reason I made a quick photo-based rock texture and one for the grass as well, which I can then blend between. The same texture can be used to create a cliff mesh and a couple of quick rocks. Since I'm applying the same texture this ensures that the transition between the rocks and the ground goes relatively unnoticed, which is essential for a believable outcome.

Can't build it? Hide it!

Very often there is one part of a model or a texture that I'm not really happy with and I don't know how to fix it. Rather than dwelling on this and wasting a lot of time trying to find a way to make impossible shapes meet, I simply try to hide it from view. If you can take something that doesn't look good and then save time by hiding it behind something you know already works, why not do it? In the world of game development it's quite often the case that you will need to include things within a strict time limit, so everything that can free up more time for overall quality is great. Of course, if you have the time, feel free to do things the hard way.



13 Include vegetation I want to enforce the feeling that the tower has been abandoned, so a bit of overgrowth always works. For this I'll make two or three simple ivy meshes and add them to places where it would make sense for them to grow, such as crevices and surfaces where they could find some grip. I also built some very basic Alpha planes for grass and some dry weeds that can be used to further entrench the tower in the scene, as well as to fill in some of the transition areas between the rock and ground.

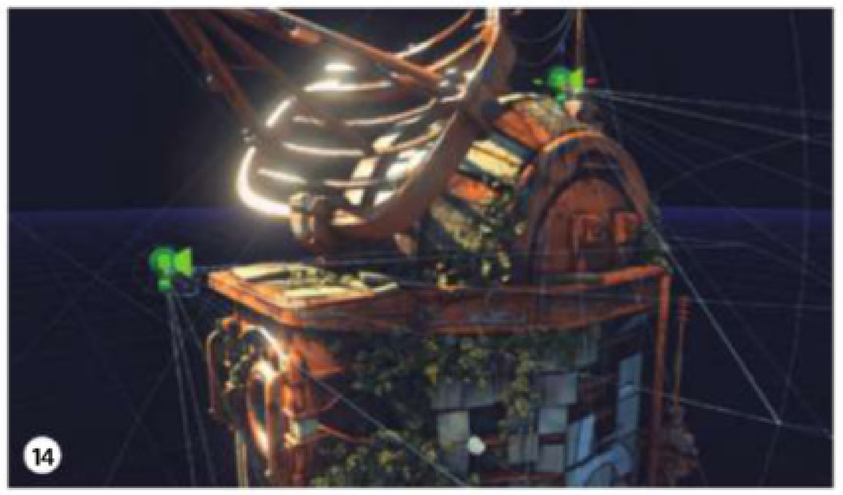
Polish the scene

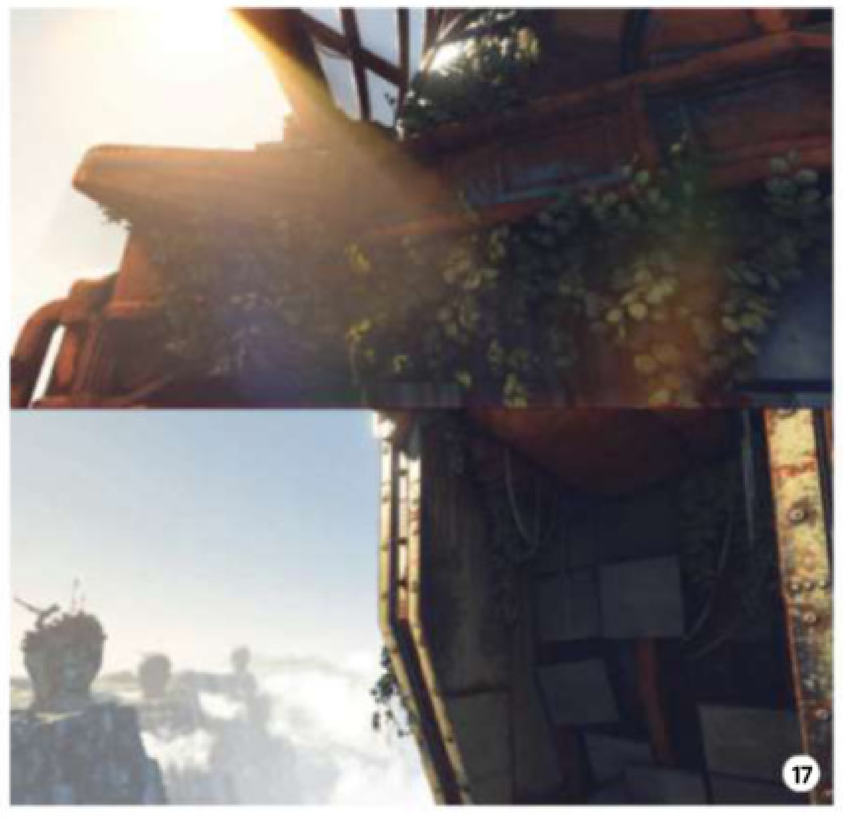
Make the final tweaks and backdrop to the scene

14 Use a simple lighting setup The lighting setup for this scene is very simple, as I only want to use a single dominant light for the Sun and then some basic spotlights to highlight some of the shapes and ivy clusters. In general, I feel that the larger the scene is, the less there is a requirement for attention to detail. This means I can focus more on the big picture, rather than spend a lot of time ensuring every single small asset really pops.

15 Add a backdrop When constructing the backdrop I make sure to have a separate window open at all times with a view of the shot of the tower. This way I can make certain that I work on the right elements and don't get bogged down working on details that won't even be seen in the final render. In this case I'll reuse the same rocks that I used up-close and just rotate and scale them until I get the shapes I need. The only new asset I'll make here is a simple sloped ground mesh, for covering larger pieces of ground. You can recycle the same tower a couple of times in the background, to give a greater sense of scale and distance.

16 Move to post-production This scene is very light on effects and post-processing. I used colour correction to make the colours pop a bit more. The original plan was to have it more sombre and desaturated, but the saturated look works much better. All the clouds are created by making simple billboards with an Additive Cloud texture placed on them.





17 Final scene tweaks In this final stage I take a step back from the scene and make final tweaks. I always do a few more passes than I think is needed. It's easy to feel like you are done with something, but taking a few extra rounds of polish is almost always worth it. Here I added some more ivy meshes, tweaked the lighting a bit, and ironed out some of the rough edges on the rocks by adding more detailed meshes.

With hindsight

Taking a look at the scene afterwards, there are several things that I realise should have been done differently. For example, several of the elements of the unique assets could have either taken more advantage of the unique texture space, or have been converted to modular parts. Also, I could have either merged my two metal plate/trim textures, or extracted more unique parts out of them. Like I've previously mentioned, never be afraid to go too modular, you never know what it could do for your scene!

• **DID YOU KNOW?** • All tutorial files can also be downloaded from: www.3dartistonline.com/files

Concept

With this character we wanted to create a hand-sculpted but realistic astronaut bust to test out the capabilities of Marmoset's new real-time, physically based renderer: Toolbag 2.

storemags.com

With the Disc

Tutorial files:

- Tutorial screenshots

Learn how to

- Master the basics of a shader used in a physically based render
- Use real-time PBR for look-development
- Understand and balance reflection and roughness (glossiness) in Toolbag 2's PBR lighting and shading environment
- Grasp the importance of tiling detailed Normal maps when defining the gloss
- Set up Toolbag 2's various Light and Reflectivity Occlusion options

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Etienne Jabbour

Personal portfolio site
www.slidelondon.com

Country UK

Software used Marmoset Toolbag 2, ZBrush, Photoshop, 3ds Max, Maya

Expertise Leading a team of character artists in the creation of techniques and processes

12 steps for ultimate realism

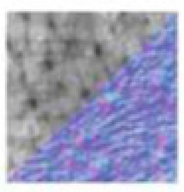
Astronaut Portrait 2013

"We take a look at how the latest version of Marmoset Toolbag can be used for quick and easy look development"

Etienne Jabbour is co-founder and art director at Slide ltd, a CG character consultancy and creation studio working primarily in videogames and videogame marketing

Next-gen consoles and graphics cards have opened up new possibilities for real-time, physically based rendering, which in turn is upping the stakes for character creation in games. This makes look-dev increasingly important, so for us at Slide this is where a real-time physically based renderer (PBR) such as Marmoset Toolbag 2 (TB2) comes in. Iteration using TB2 as a viewer is incredibly fast due to the solidity of image quality in real-time. This speed of iteration doesn't just ease the learning curve for those that haven't used a physically based renderer before, but is also essential in producing a realistic human face.

The following steps will take you through the process for getting a character from a base mesh to a fully surfaced and lit face in a few easy steps. You'll learn how to benefit from Toolbag 2's PBR shading and lighting engine throughout the entire process of creating a character.

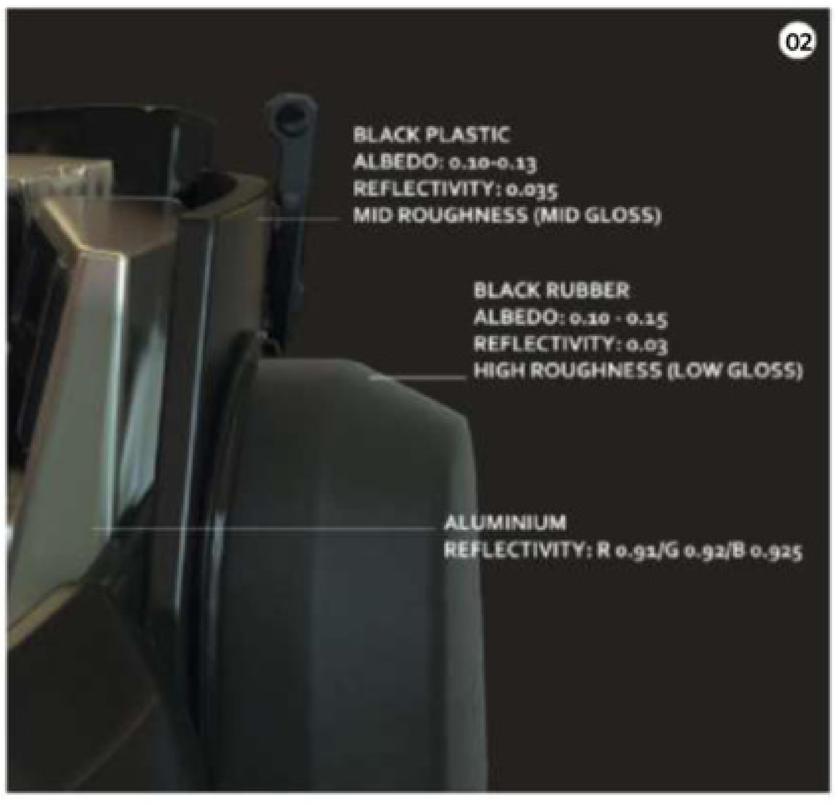


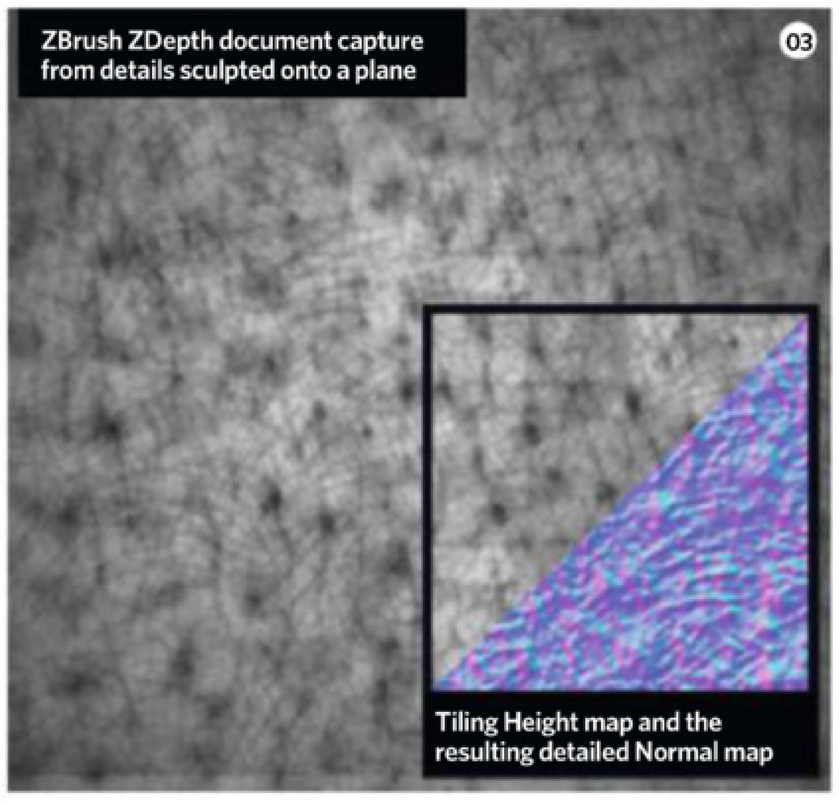
Prepare for the look-dev process

Ensure that you set up correctly for a good start

01 Prepare your render meshes Load in your UV'd render meshes into Toolbag 2 and start applying relevant basic shaders. As this is just a look-development process, we don't want to break the link between the render mesh and in-progress models or sculpt, so UV all the base meshes before sculpting and export a suitable level in ZBrush to use as the look-development render mesh. Once this look-dev process is complete, we can derive a final asset from the data we've generated. Set up basic skin shaders (one each for the head, eyes and hair) and a metal shader, rubber shader and plastic shader. You can use the colour pickers to establish starting-point Albedo values for the various surfaces without the need for maps.

02 Use PBR specularity and glossiness As a PBR renderer, Toolbag 2 reflection and gloss is based on the idea of measured real-world data. Physically based rendering is approached in different ways by different renderers, so familiarise yourself with the basic paradigm and then focus on what the value ranges in Toolbag 2 are referencing.



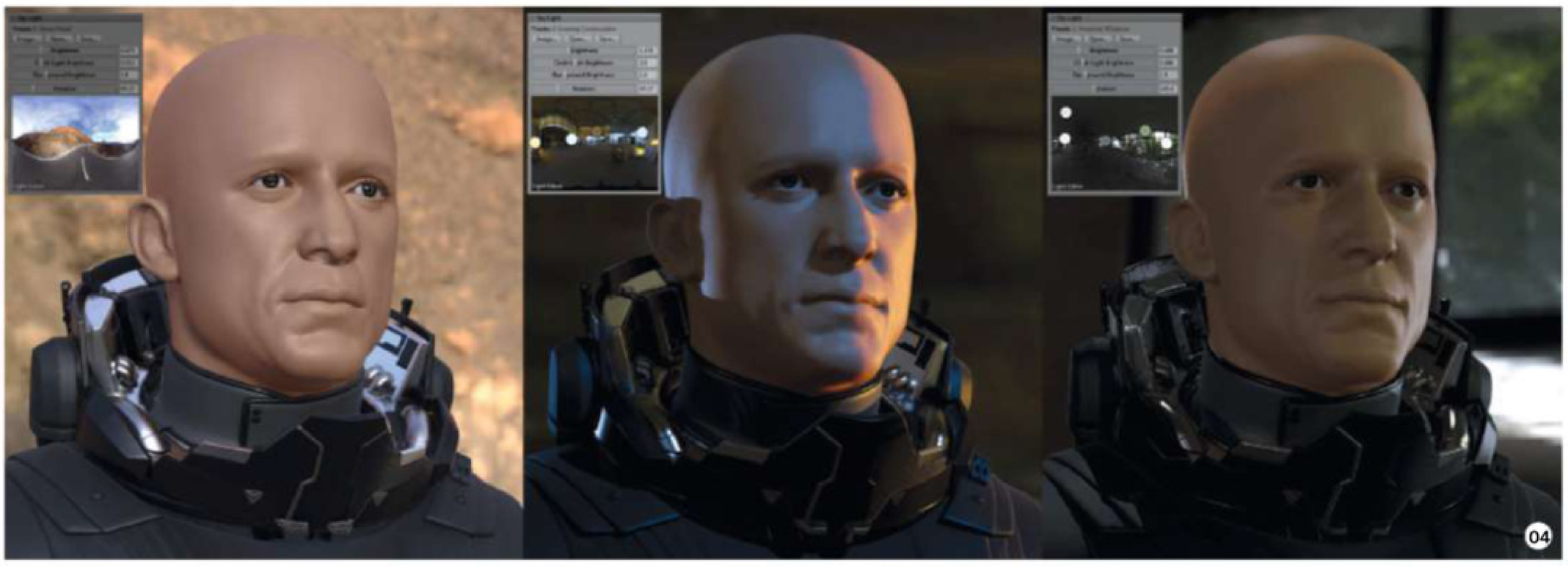

ZBrush ZDepth document capture from details sculpted onto a plane
03
Tiling Height map and the resulting detailed Normal map

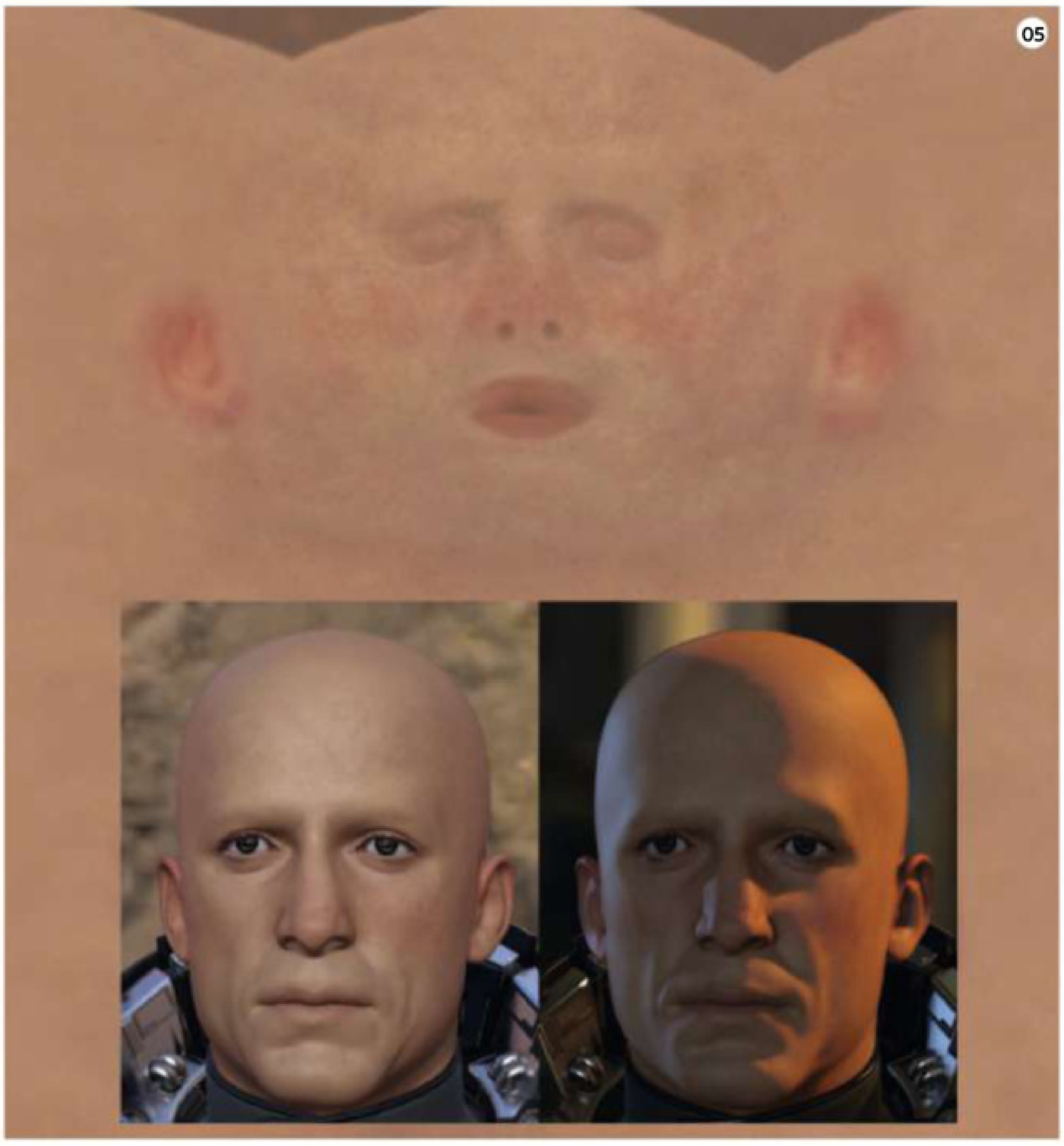
03 Consider the micro details

Now drop in a tiling Normal map to replicate small details. In the case of skin these are the sub-millimetre details such as fine pores, super-fine cracks and clumps of skin cells. Having this defined at a very high pixel density is an essential part of defining a surface's roughness or glossiness. With skin it's key to getting an overall oily rather than wet or plastic look – this is the reason for dropping the map in now, as it impacts on later maps.

Progress the look

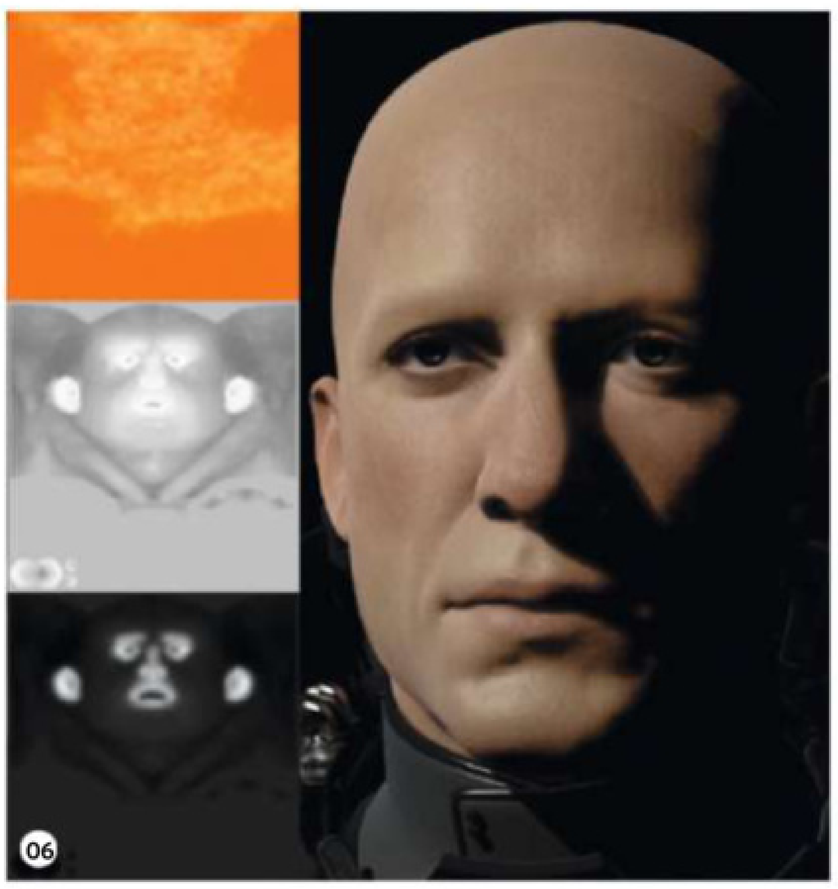
Focus on developing the likeness of your model





04 Set up the lighting It's a good idea to jump between diffused lighting and more cinematic, expressive lighting to get a complete view of your model and shaders. Toolbag 2's Sky, in combination with its Light Editor, makes this process incredibly quick and intuitive. Simply load in an HDR image into Sky, then click on its thumbnail in the Light Editor to drop a directional light with the direction, intensity and colour of the pixels you clicked on.

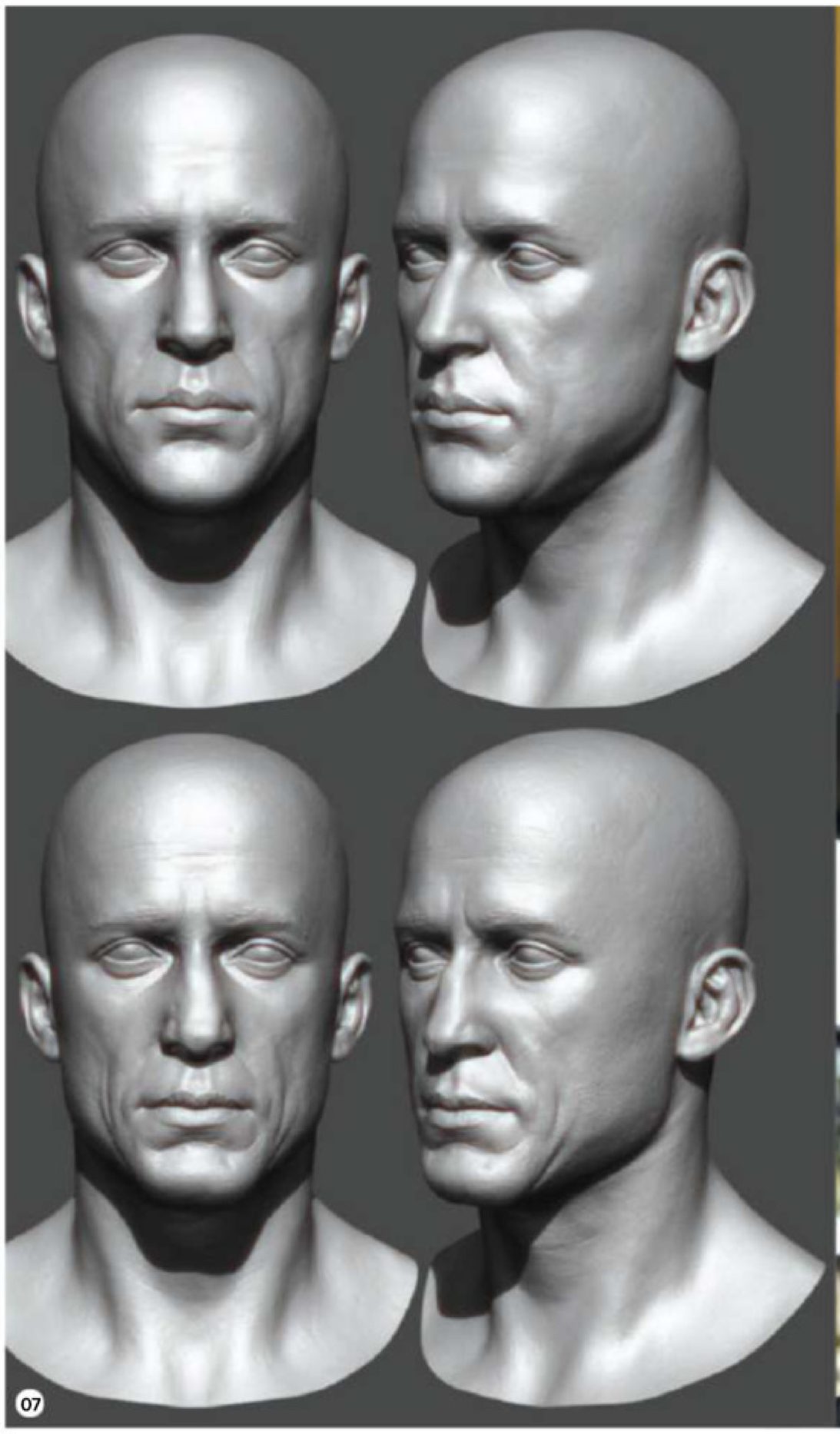
05 Use a first-pass Albedo map This is a key part to getting the most consistent and satisfying results from a physically based renderer. You can find links and info on this online, as well as on the Marmoset Toolbag 2 Beta thread: **www.polycount.com**. However, the main thing to remember is that the Albedo map should only contain the material's colour information and possibly very small-scale Cavity Occlusion. For the skin, start by using a range of brushes to blend in yellows, reds, greens and blues into a base skin tone to start giving life to the various regions of the face.



06 The basic skin shader setup Next drop the lighting down to a single light hitting the face from either the upper-left or upper-right side to expose the light falloff. To create good shadows, quickly tweak the Scattering setting until the skin starts coming to life, but hasn't blown out in any areas. Now set the Shadow Blur so the shadow is just noticeably blurring and set the Occlusion Blur to 1. Drop in a Subsurface map that defines both the colour (in the RGB channels of the map) and intensity of the subsurface effect (using the Alpha channel), as well as a greyscale image to define areas of greater or lesser translucency. Raise the IBL Contribution to boost the ambient light and check if any settings need further adjustment.

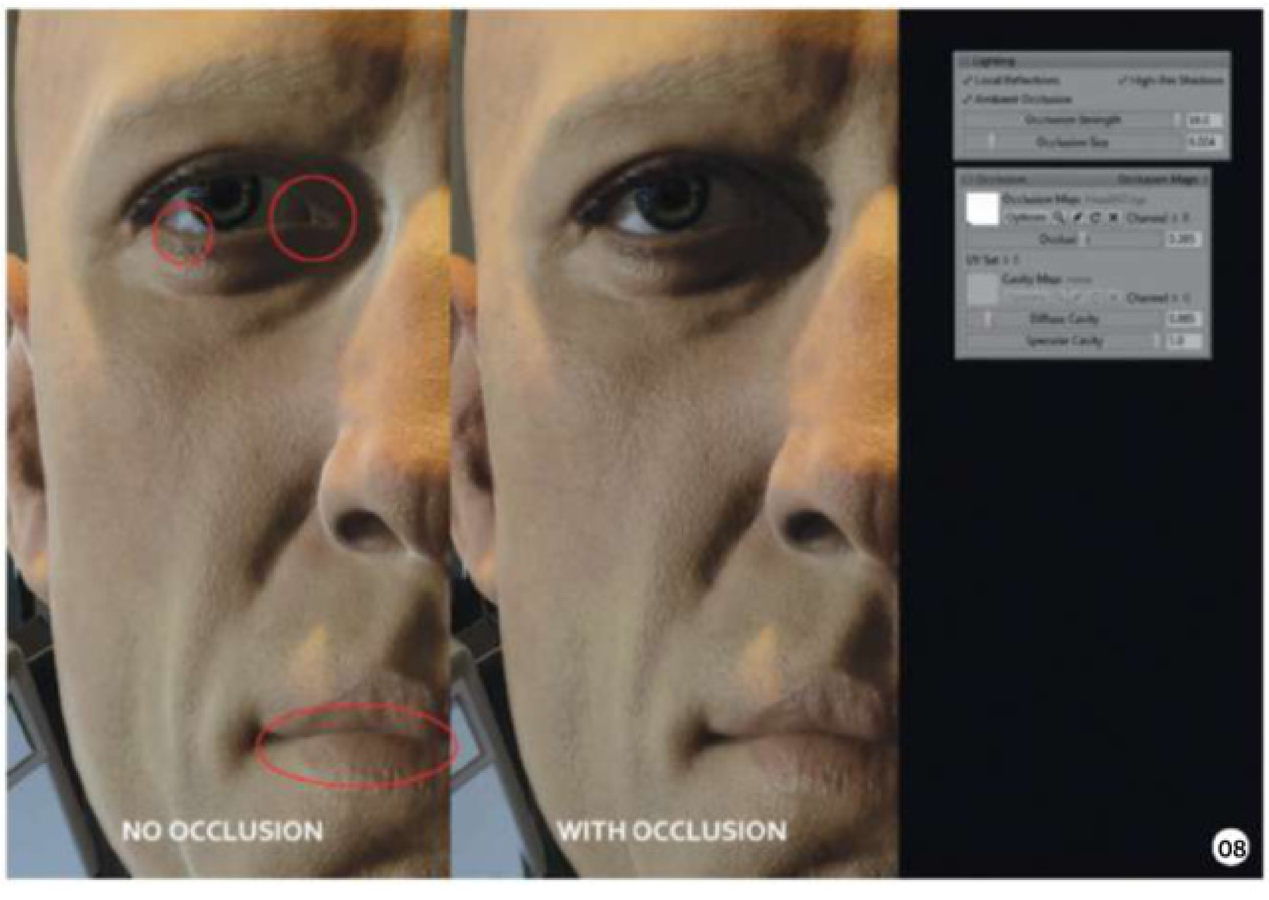
Stay flexible and keep refining

You should use your set-up time to keep tweaking your character's likeness. As the shaders are coming together I focus in on really bringing out the personality I'm aiming for while taking care not to break the realism. I gather references of people that I feel exemplify these attributes. I try isolating the specific features that telegraph these characteristics, so as to better inform my sculpt.



07 Make a second pass of the head

At this stage you should have something that's looking pretty convincingly human, if a little jarring due to it's early stage in development. You'll have some features that are either too exaggerated or are structurally bringing the believability of the face down, so this is a good stage for spotting these by trying out different light setups and positions. Gather any further reference you need to help address any issues you're seeing, constantly bringing in newly adjusted meshes from ZBrush into Toolbag 2 and applying the existing shaders so as to review progress under more realistic conditions.



08 Light and reflection occlusion

Once there's more form and detail to the character it's time to set up some Occlusion maps. Toolbag 2 has several ways of occluding light and reflection, but the main four are:

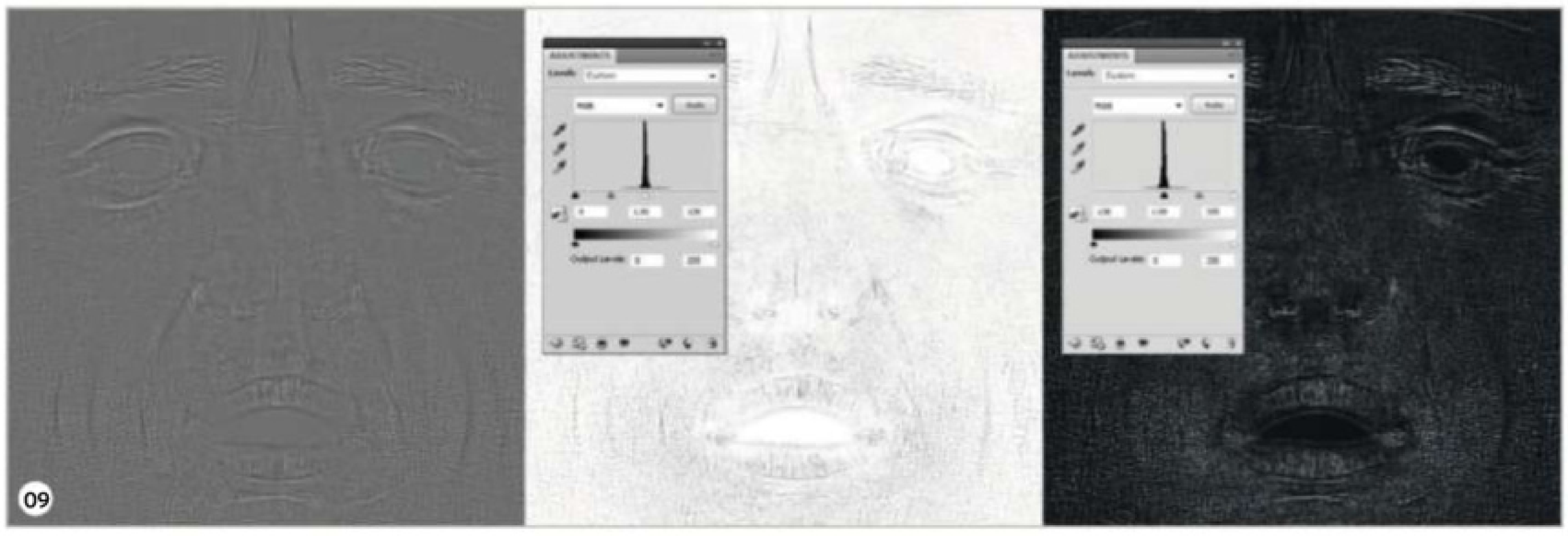
- **Screen Space Occlusion:** This has good control over intensity, spread and scale. It can be ramped in the skin shader with the subsurface colour using the Occlusion Blur slider.
- **Occlusion Map slot:** This works with the lighting so as to occlude image-based lighting, but be minimised by direct or dynamic lighting.
- **Cavity map:** This occludes reflection and is predominantly used for detail occlusion, but by adding in areas such as the inner lips and nostrils it can also get rid of reflection leaks and control the location of fresnel from your reflectivity.
- **Screen Space Reflections:** As well as reflecting brighter objects near a surface, the SSR also goes a long way to occluding objects from Sky reflections in areas not helped by the Occlusion maps.

Getting the right balance between these options will give incredibly solid results and bring everything together nicely.

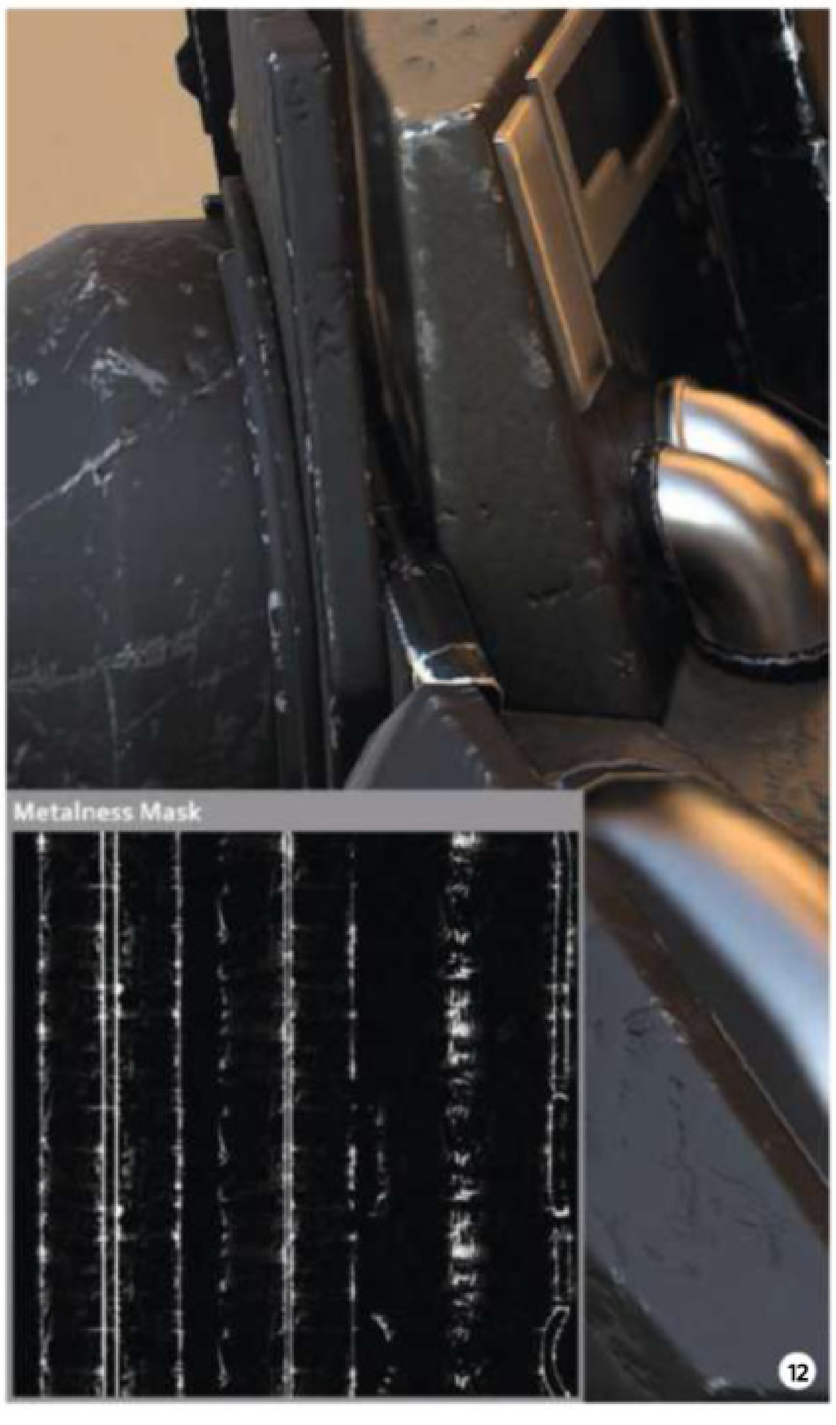
Finish with small details

Bring your character to life with final refinements

09 Extract greyscale details from the sculpt Once the character's head has been detailed in ZBrush, extract some greyscale detail or Cavity maps from the Normal map/ high-resolution model for use in the various textures. There are many different ways to do this, but the most important thing here is to produce a crisp and normalised greyscale map as a starting point. Next we can separate this map into light and dark regions by using a Levels adjustment layer in Photoshop to make two separate versions of the image. The first version will include only the dark areas (the Crevice map) and the second will include just the lighter areas (the Peaks map).



10 Add extra detail to the textures Drop a coloured version of the Crevice map into the Albedo on a multiplied layer with a low opacity (between 5 and 20%) that has been colourised towards the subdermal colour. Next, take the original Crevice map (with the black depth details against white) and save it for use as Toolbag 2's Cavity Occlusion map (we can only use the Reflection Occlusion component of this shader). This should boosts the feeling of depth in the details, especially for the skin.



Match the real world

The big advantage with this entire process comes from enabling the artist to work on the key stages of a character's face, all while viewing their changes quickly and easily in a realistic setting. If you are using specific photo reference of a model or actor, you can quickly set up lighting that is similar to that in your reference images. This provides a better understanding of how the light is reacting to the features in CG compared to that of the real world.

11 Work on the hair As Toolbag 2 can easily handle high-poly objects, hair can be approached either with Alpha-mapped flat polys, or using a hair system and converting the hair to splines, then turning these into hair tubes. The main point for this asset is to quickly define a hairstyle that can then be reproduced for your target engine. The Dithered Alpha setting works great for fleshing out the hair without worrying about the technical constraints of Alpha-sorting, allowing you to quickly generate poly planes using software such as ZBrush's FiberMesh. The key with the Dithered Alpha mode is to not have any gradation of opacity along the hair strand, but to define the density of a certain area of hair through the number of hair strands.

12 Replicate chipped metal As metal has very different reflective properties than most other materials, the Metalness mask under Reflectivity enables you to define areas that react as metallic or not. This is essential when putting dirt or rust onto a metal surface, or when chipping through from a coating to a metallic underlay. Just create your dirt, rust or coating in your Albedo map, then take the layers that make them up and generate masks for these areas that will be made black on an otherwise white Metalness mask. Once this is done, adjust your Glossiness map to define the different surfaces and include the mask in your Normal maps.

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Samurai
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Masterclass

Rainer Duda is a Houdini artist with a great deal of experience with the software, particularly when it comes to blowing things up, as he demonstrates here

Rainer Duda reveals how to get smash-happy with some impressive effects in Houdini

With the Disc

Tutorial files:
- Video tutorial
- Pedestal.obj and .mtl

Destruction in Houdini 13

"Rainer Duda reveals his artist-friendly destruction pipeline in Houdini 13"

When it comes to creating destruction effects – or better completely blowing things up – Houdini is one of the most powerful software packages around.

Houdini can destroy anything, from a single car, through to numerous cars on a bridge, the bridge itself, and then the entire city surrounding it. It's a powerful tool to say the least, capable of scaling from the small-scale destruction through to the obliteration of worlds. However many artists fear Houdini due to its complexity and the time-intensive work involved.

We'll try and simplify things here. This tutorial covers the steps to building a basic destruction pipeline that utilises the Houdini 13's improved RBD Bullet Solver, in combination with Voronoi fractured pieces, all in a relatively simple, artist-friendly way.

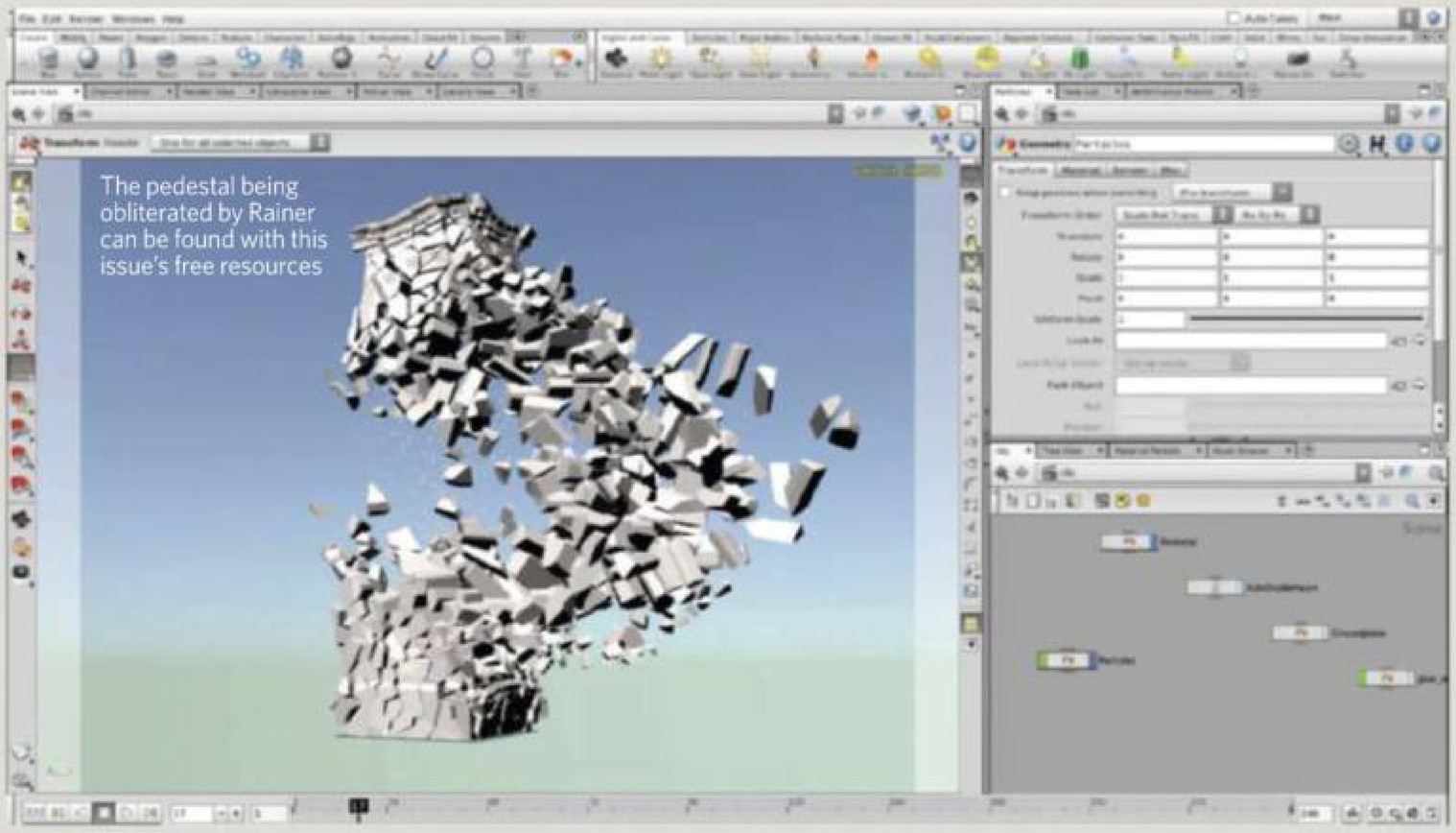
We will start by covering how to import objects into Houdini 13, ensuring they look impressive before preparing them for destruction. The object will be converted into RBD and the scene will be prepared with additional RBD objects to ensure a fully working environment.

We'll be using elements such as a brickbat projectile, which will cause the destruction effect, and a special Glue solver that will take care of the constraints between the fractured pieces. This way you will be able to control the result and size of the impact on the pedestal.

Various parameters offer the capacity to create both completely realistic or totally surreal destructions. You can experiment with these, which is a good method for learning Houdini and exploring how the procedural workflow works.

To improve the visual quality of the plain destruction, we will add particles and smoke will to the fractured debris. To save time, the geometry of the simulation will be cached to the hard disc in BGEO files and loaded from there as the base for the particle system. This enables smooth particle simulations as well as less calculation time. Using Force and Drag nodes, the particle flow will be controlled to look more impressive. Custom collision meshes will control the particle collisions so that they fit the RBD collisions.

You can use the whole network as a base for your own destruction sets. Check the tutorial files with the issue for the accompanying video tutorial!



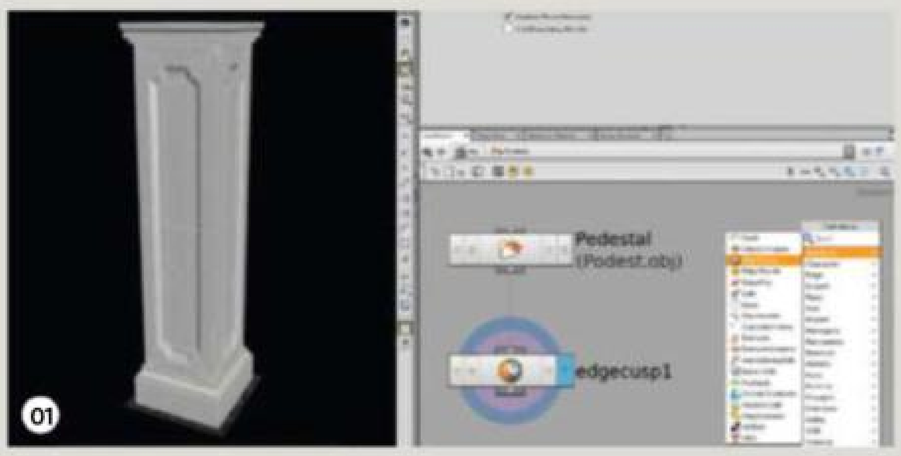
Refine parameters for better results

The steps in this tutorial will guide you through a destruction pipeline that can lead to a huge destruction network. However, before the network grows, the simulation can be visually improved by increasing the particle count inside the Source node, and the behaviour can be fully tweaked in the Force node. Alongside particles, this provides a great quality boost when the Voronoi Fracture cells are increased through the Scatter node inside the Pedestal Geometry node. Just input the value as 1000 and update the cached files to get a higher quality of destruction.

Appetite for Houdini...

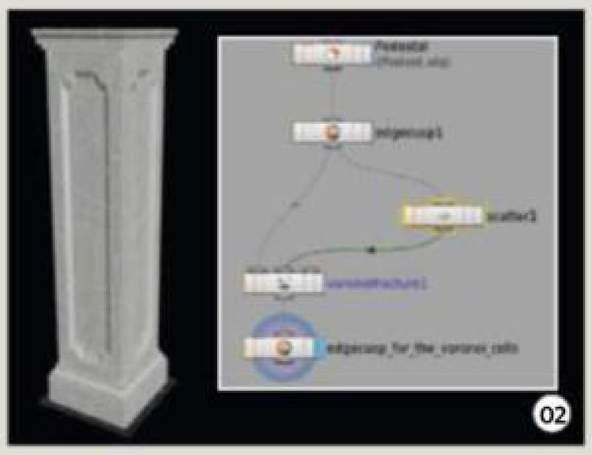
01 Prepare the object

Here we'll destroy a pedestal made of stone. This asset was created outside of Houdini and must be imported by clicking File and then Import (you will find the asset supplied with the issue). There is an option labelled Geometry. Use this to import the OBJ file. This file only uses one smoothing group so it's necessary to make the surfaces flat again. Head to the Network Editor panel and append an EdgeCusp node to the File Import node inside the Pedestal Geometry node. Nodes are located in the Tool menu, which can be opened by a Ctrl/right-click inside the pane.



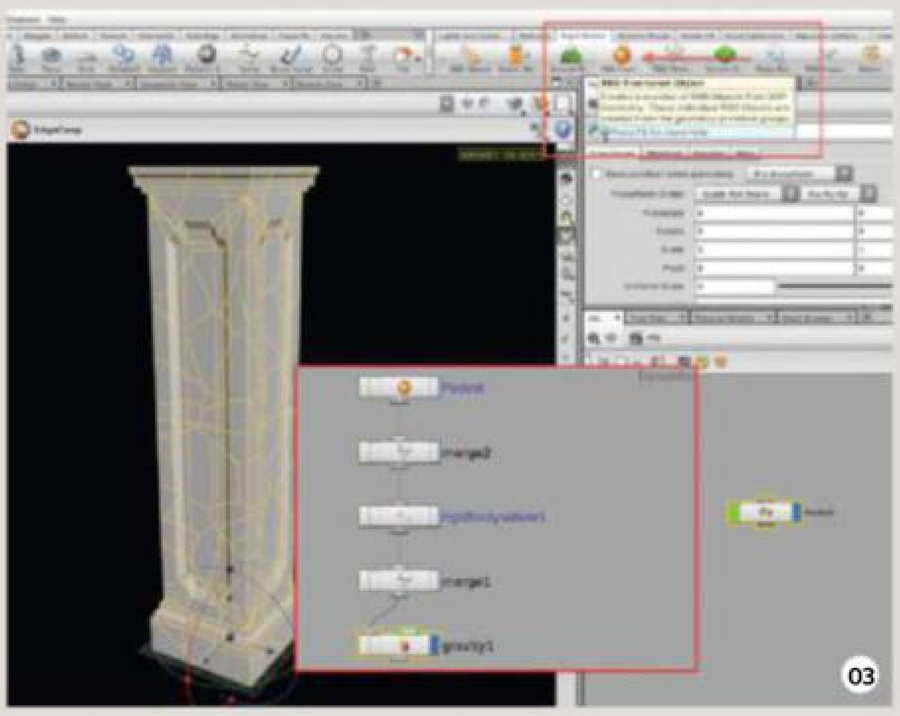
02 Set up the debris

Now we must prepare the debris with Scatter and Voronoi Fracture nodes. First, append a Scatter node to the EdgeCusp node and then the Voronoi Fracture node. This means both will get a separate input from above. Now we need to connect the Scatter node to the second input of the Voronoi Fracture node, because the Fracture node needs to know the points to create Voronoi cells. When experimenting, it's wise to jump back to the Scatter node and decrease the number of points to 100 or below in the Parameter pane.



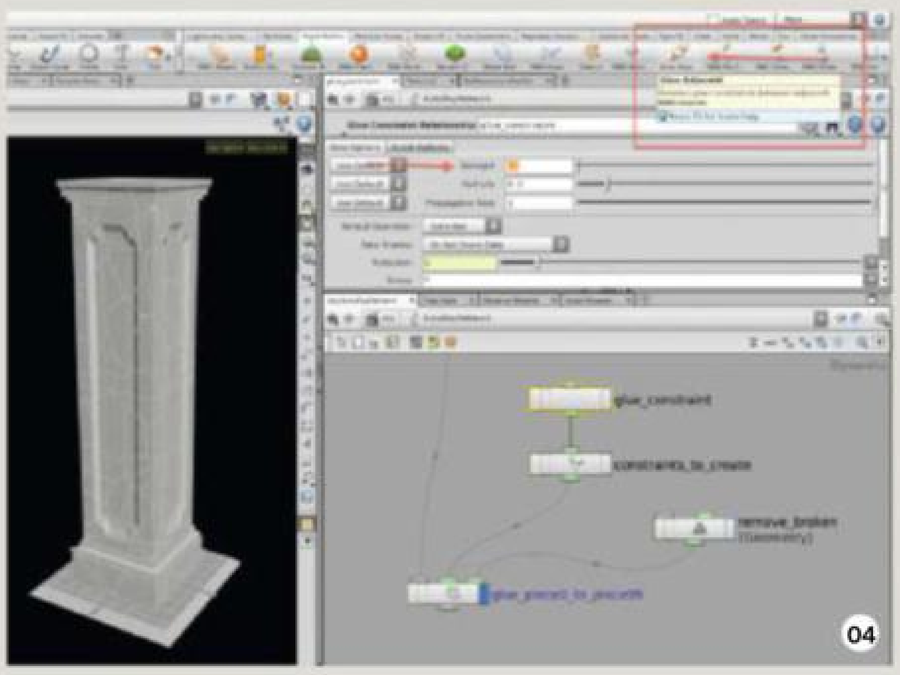
03 Ready the RBD objects

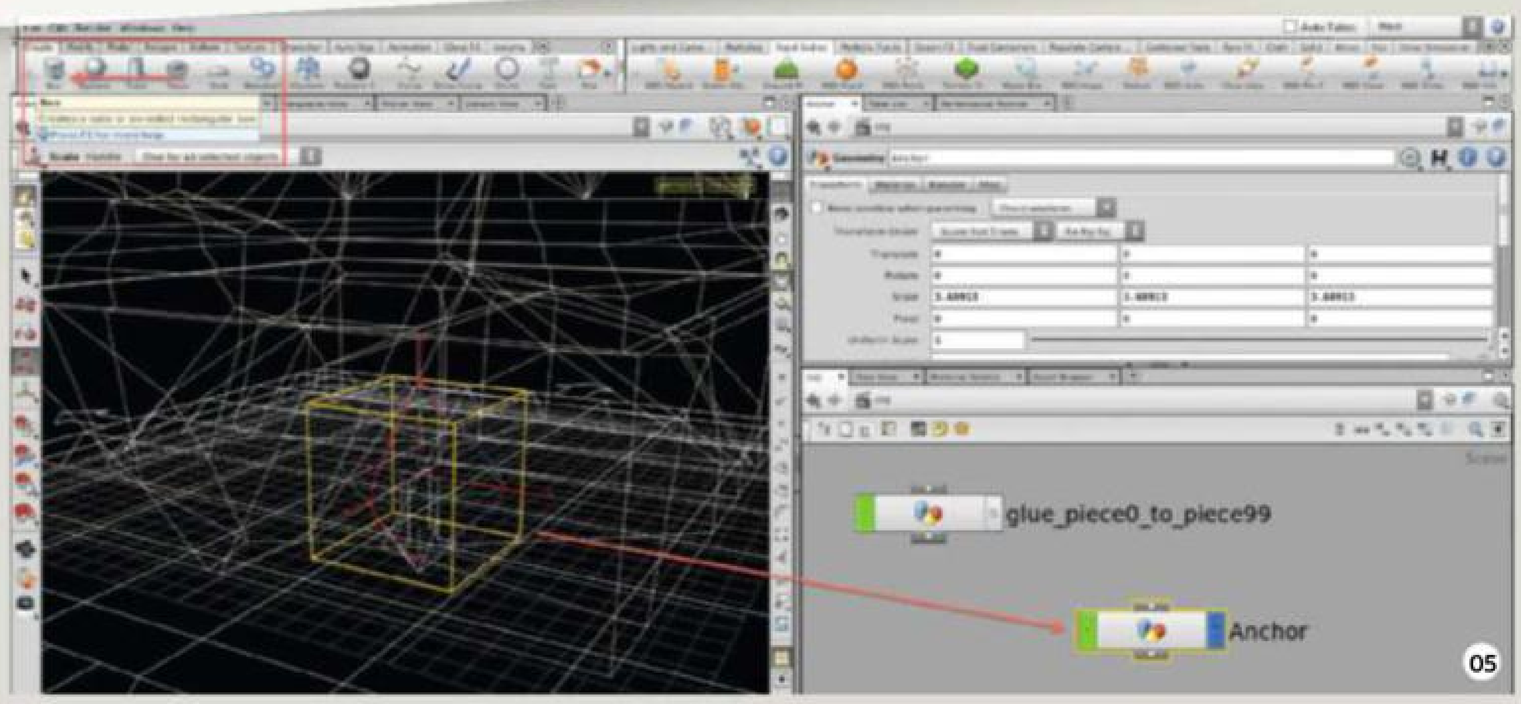
To make the rigid-body dynamics work, we must first tell Houdini that the pedestal is an RBD fractured object. This means that Houdini will create a number of RBD objects based on the Voronoi fractured pieces. Select the pedestal and click the RBD Fractured Object function in the Rigid Bodies menu (found in the Tool palette, above the Parameter pane). Now, in the next pop-up window, select a fractured object instead of a packed one. After this confirmation Houdini will automatically create a DOP (dynamics operator) network.



04 Finalise the pedestal RBD setup

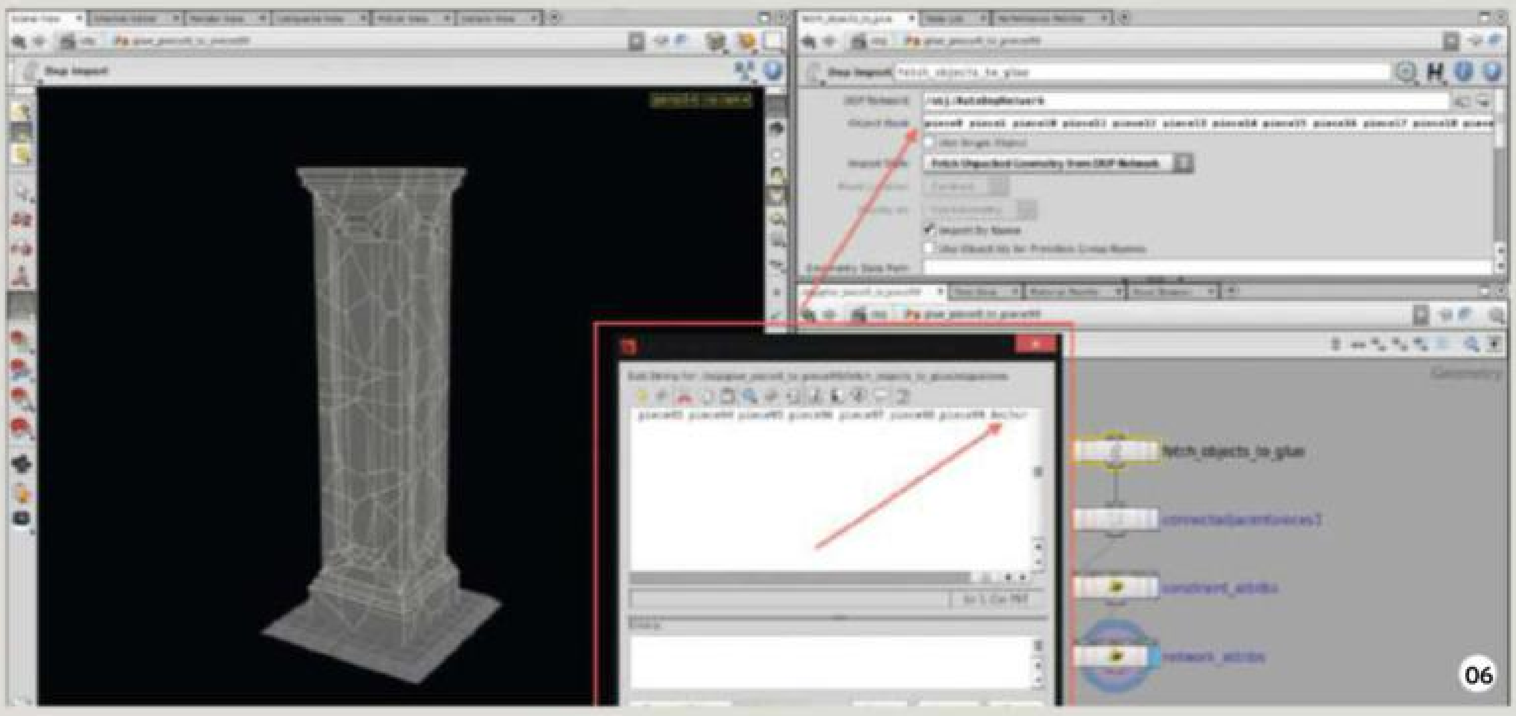
Now, as the pedestal is finally in place, we need to create a ground plane for it to sit on. This object adds an infinite ground plane in the scene, which is suitable for RBD simulations. Just click the Ground Plane function in the Rigid Bodies toolbar and then create Glue constraints between the fractured pieces. To do this, select the pedestal and click on the Glue Adjacent function. To activate this hit Enter and the DOP network will automatically display the new glue elements. Now jump into the Glue Constraint node and switch the Strength to -1.





05 Place an anchor

If you play the simulation now, then the pedestal will not be destroyed because the Strength attribute is set to -1, so it would basically fly away in one whole piece. To tell the pedestal to remain in the same spot, we need to add a kind of anchor. To do this, apply a box object in the scene and place it right at the centre-bottom of the pedestal. Press the Box function in the Tool palette, scale the box up and put it on the origin by adding zero values to the translation. The object manipulation tools lie to the left of the 3D viewport.

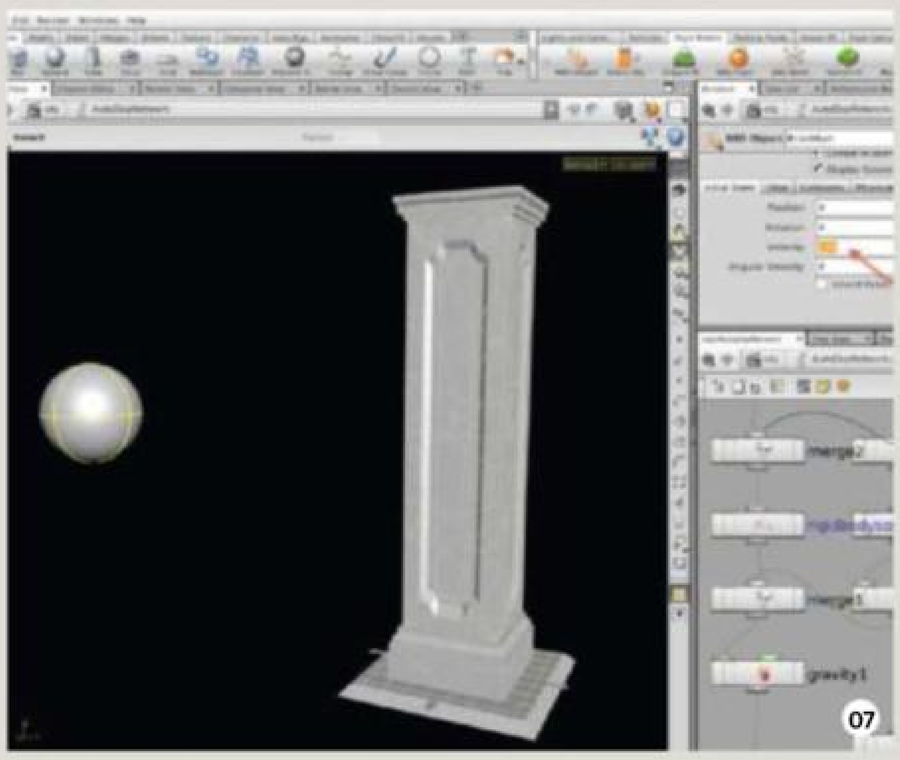


06 Glue the anchor

Now that the anchor is in place we need to glue it to the fractured pieces. However, first we must make a static object out of the anchor. Select the box object and press the Static Object button in the Rigid Bodies toolbar next to the Ground Plane function. We need to include the anchor using its name to the list of pieces inside the Glue node, so to do this just jump inside the glue_piece0_to_piece99 node and add the anchor's name in the object mask list inside the first node called fetch_objects_to_glue.

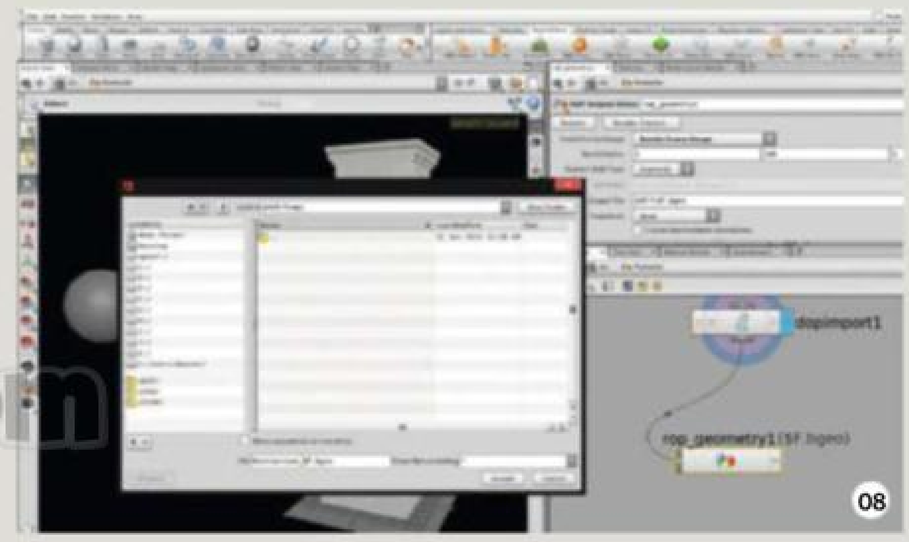
07 Include the impact object

Now it's time to add an object that will collide with the pedestal and destroy it. This can be any object you wish. Here we will use a simple sphere as the impact object. Apply a sphere from the Create toolbar, scale it up and place it next to the pedestal. After this we must convert the sphere into an RBD object by clicking the RBD Object function inside the Rigid Bodies toolbar. Also, add some velocity to the sphere inside the DOP network. There is a node called Brickbat that holds the Velocity field, which we will change to 150.



08 Establish a geometry base for the particles

Now we can give the simulation a more effective look and feel through the inclusion of smaller debris. As this will make use of particles, which will make for a far heavier scene, it's wise to render the simulated geometry to a cache before handing it to the particle system. We need to jump inside the Pedestal Geometry node and append an ROP (render operator) Geometry node at the end. We have to tell this node to render a complete frame range and specify an output folder, while also including the $F at the end of the name. Before we bake the simulation, we have to change the Strength of the Glue Constraint node inside the DOP network from -1 to around 1500.



Increased visual fidelity using dust

When stone breaks we don't just get broken pieces and debris – dust is also produced, like very fine debris. To achieve an effect like this, you need to select the pedestal and open up the Pyro FX toolbar. There a solver called Billowy Smoke that adds rising smoke from objects, which must be used. After this the DOP network will offer new options to refine the smoke quality. Increased visual quality will be possible by decreasing the Division Size of the smoke voxels to a value of 0.5 in the Pyro node. This will create a much more realistic-looking simulation.

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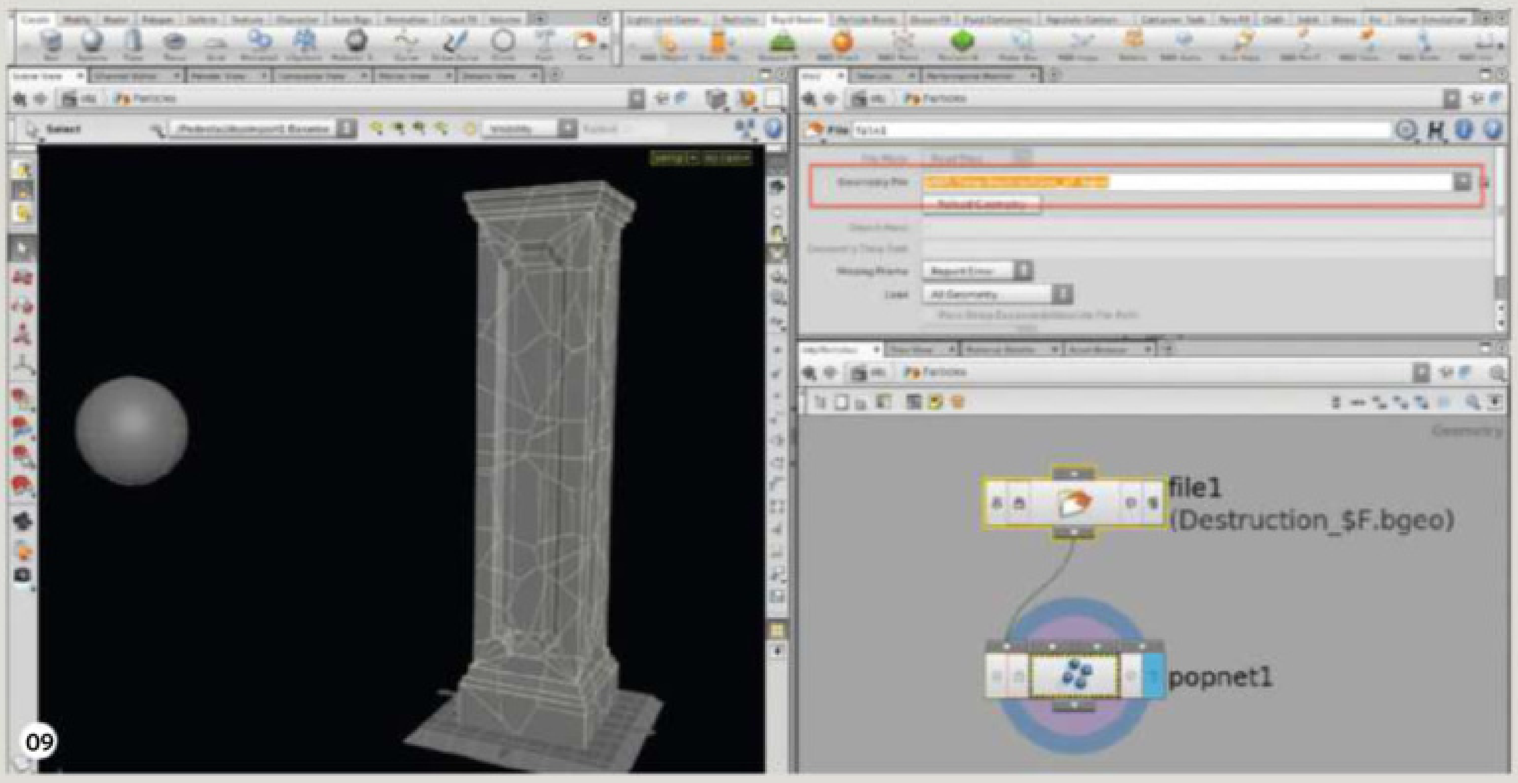
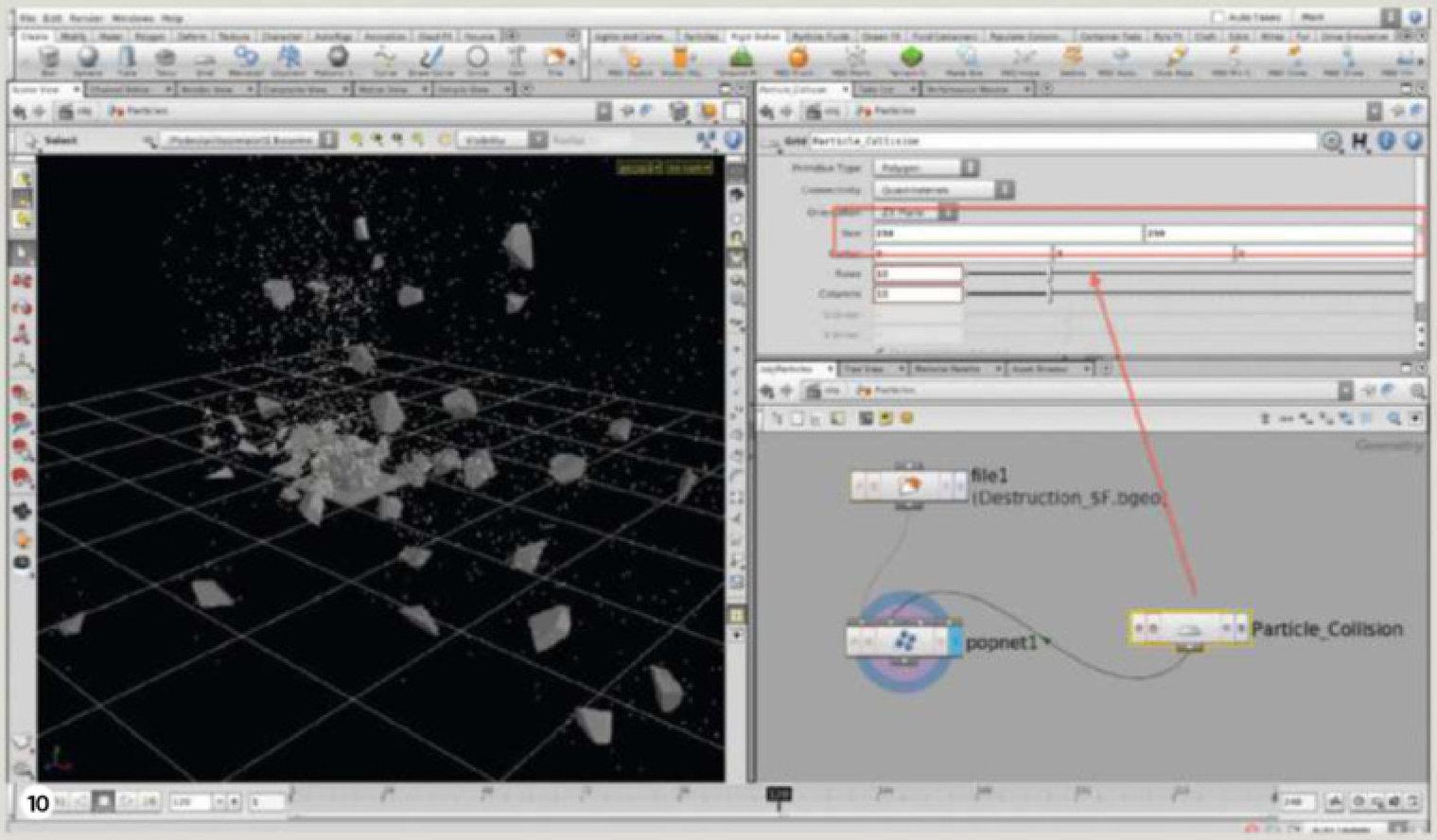
09 Add a POP network

Now it's time to add the small debris to the fractured pieces. To create this effect we need to add a new Geometry node in the Network Editor pane, rename it 'particles' and add the directory of cached files into the File Input node under the Field Geometry file. Once this is done we can create a new POP network (legacy) below and append it to the File Input node. Inside the POP network we can specify the sources, our fractured pieces, as particle sources via a Source node. For the Emission type we need to pick Surfaces (Random) and for the Geometry Source use First Context Geometry.



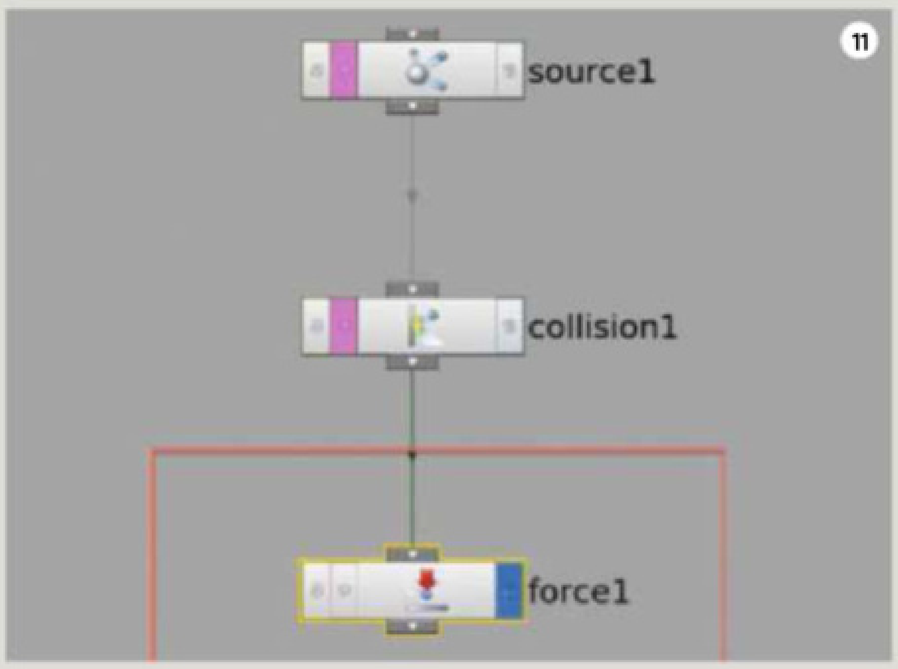
10 Create a collision plane for the particles

To give the particles a natural feel it's necessary to add a collision plane. Create a Grid Object node next to the POP network, scale it up and call it 'particle collision'. We don't need to use the toolbar for this, as the Grid Object node lies inside the Tool menu as the POP network. Now connect the Grid Object node with the second input in the POP network. Also, for the Collision node inside the POP network, we need to use a second context geometry as the input and the behaviour called 'bounce'.



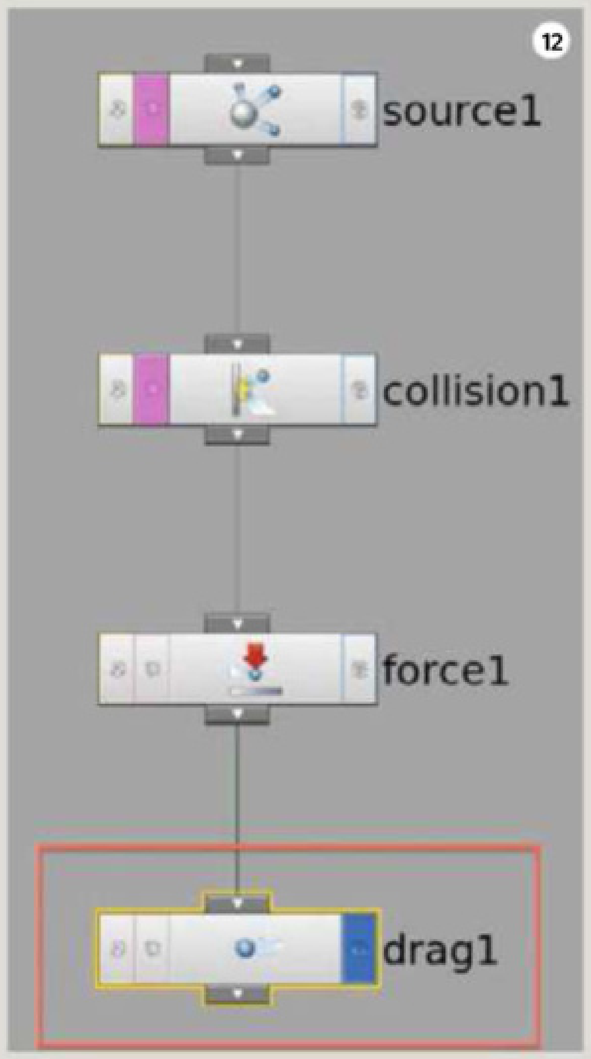
11 Apply some weight to the debris elements

Even if the particle simulation looks finished and ready to go at this stage, we still need to apply some more realistic behaviour to the system. The debris also need to have a sense of weight and underlying gravity. To get around this, first let's add a Force node and append it right under the Collision node inside the POP network. Under the Force section, the Y field needs a value of around -7.5 to indicate the weight. If it's the case that the simulation looks too continuous, the Noise section enables various options to bring in some kind of turbulence, as well as special types of noise.



12 Use impact to inform particle direction

The brickbat or sphere projectile shoots through the pedestal and causes a huge impact, so we have to give the particles a Drag function. As they all have a Weight indicator, it's time to add a Drag node and append it to the Force node. The Drag node enables us to affect the particles, so even if they hit the ground – based on the Force node – they will we pulled the same direction that the impact leads. There are no parameters to add in this node, because a Linear Velocity is activated.



Using FBX instead of OBJ

There is no need to work with plain OBJs, though we are doing so in this tutorial. You can save nodes by importing fully prepared FBX models that contain shaders as well as assigned textures. After the import, Houdini will automatically create and assign all materials inside the new SHOP (Shader operator manager), so you can work directly with the final image.

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Back to basics

Gustavo Åhlén shows how to model an antique chair using the latest features in CINEMA 4D

With the Disc

Tutorial files:
- Final Model.c4d
- CINEMA 4D - Video tutorial
- Tutorial screenshots

This is the final render of the antique chair created by Gustavo

Build C4D arch-vis assets with NURBS

> Here we will showcase how to model a simple antique chair in a few simple steps, using splines, Sweep NURBS and Subdivision Surface objects

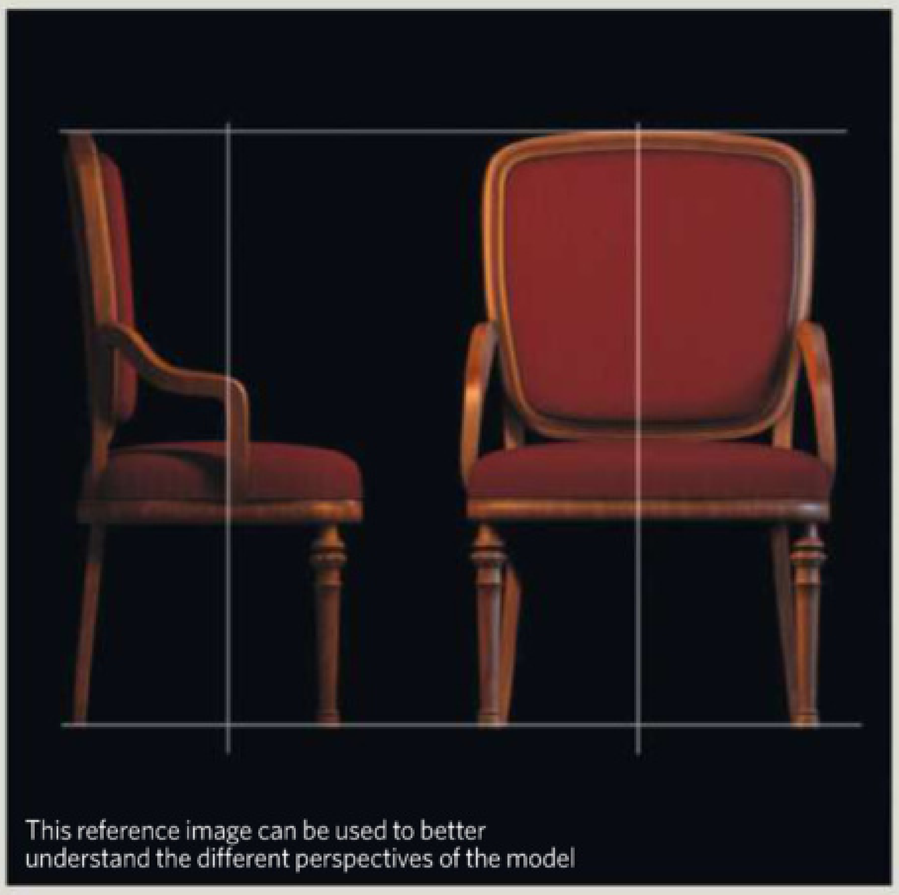
In the following steps you'll discover a simple method for modelling an antique chair. There are many overly complex ways of modelling a chair like this, but after running a few experiments I found a far simpler method, which I'll share with you. The process detailed here will impart many useful and time-saving approaches.

Usually when we start using CINEMA 4D we can select from many different ways to achieve a similar result. Usually we would start with a simple cube and use the Extrude option to create the frame of the chair, then its other parts. However, this takes more time than is needed.

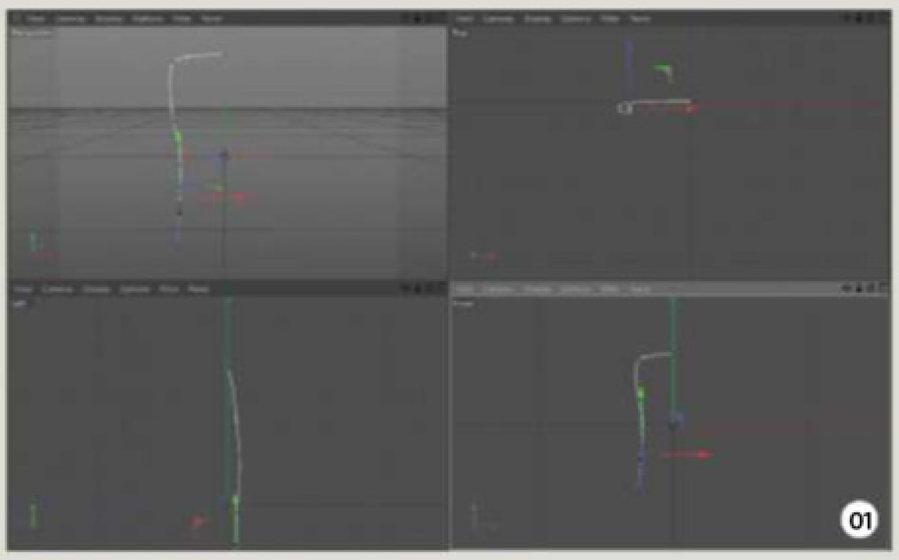
The process I've found particularly helpful in the creation of the frame of the chair are using Sweep NURBS and splines to create the shape. The splines can be applied as rails so that a geometric shape such as a circle or rectangle can follow the shape of the backrest, armrests and legs. It's important that we can get an approximate shape that we can then manually adapt to the final model.

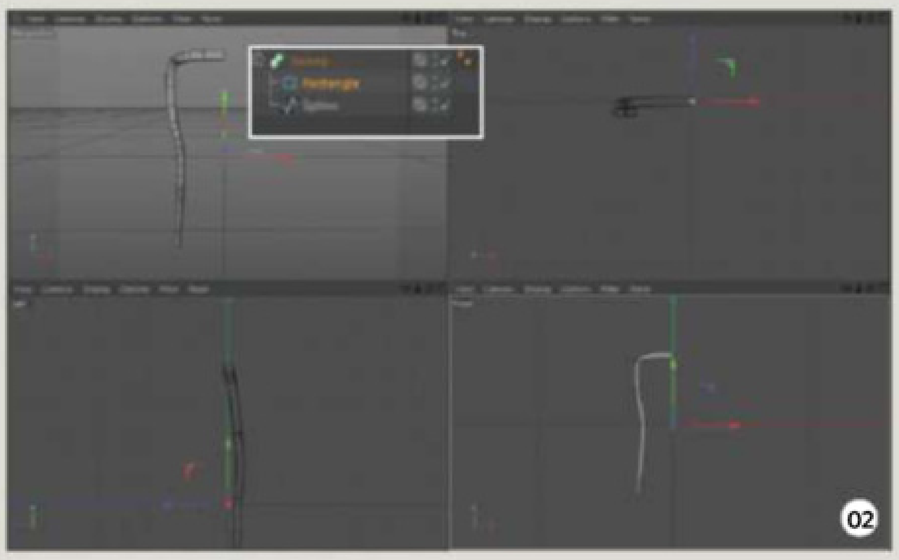
Once we have the approximate shape set up, we can create cuts around the edges using the Knife tool, increasing the low subdivision model using a Subdivision Surface object. Don't forget to create these cuts around the low-poly model, because if you import the model into a Subdivision Surface without making these necessary cuts, you'll effectively lose the model that you want to produce. You can also add more edges using the Bevel tool.

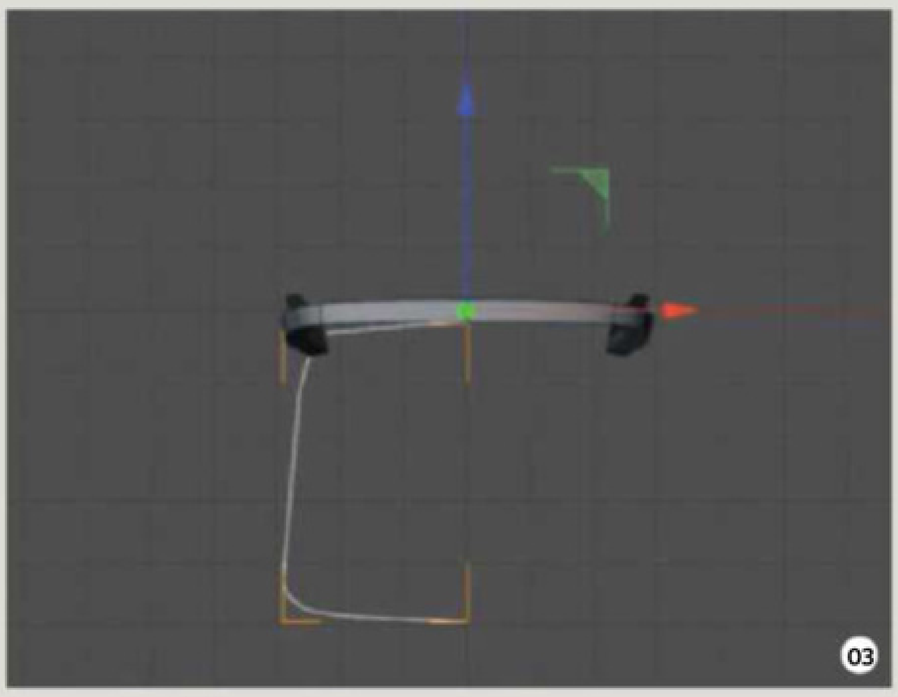
The process of capable arch-vis modelling is one that you should really focus on, because mastering and memorising these techniques will open up a huge range of possibilities for you when it comes to finding customers in new areas of work. In my personal experience, hotels, shopping centres, museums and more might buy your 3D furniture designs and send them to be manufactured. Any good idea could be approved and used in a variety of places. So, follow the process carefully and consider how what you learn could be applied to other projects. Be sure to check out the video tutorial with the disc!



This reference image can be used to better understand the different perspectives of the model







The frame of the chair forms the essential shape of the overall model

Model an arch-vis chair

01 Shape the frame

First we need to create the frame of the chair using splines and Sweep NURBS. Don't forget to use a Frontal view for this. Go to Draw a Freehand Spline and select Bezier. Now you need to add the first point in the middle of the X axis and create the other points as you can see in the attached image. Use Adaptive Interpolation Points for this. Once you have established the points using the Frontal view, change the view to Left, then drag and drop the points as in the example vertex in the accompanying image.

02 Add Sweep NURBS

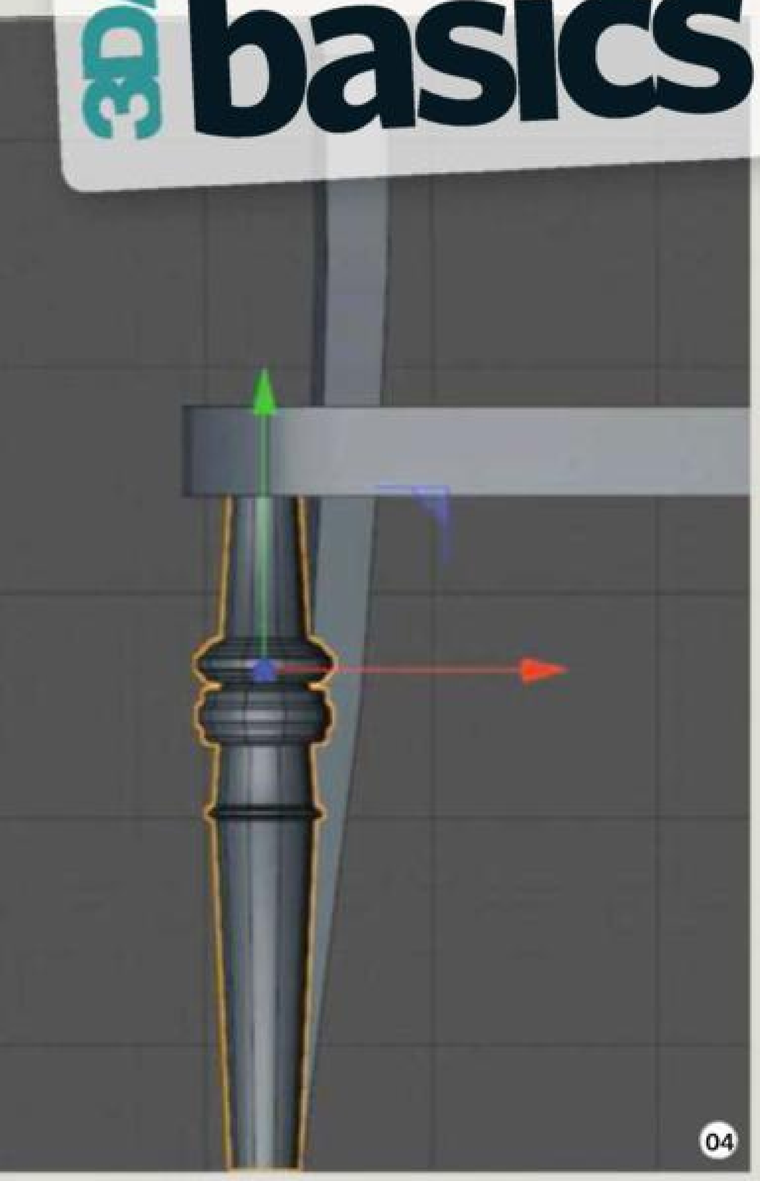
Next, go to the panel where you have selected the splines and select Rectangle (W=42; H=35). Add Sweep NURBS to the scene. Using this method we can convert the chair frame into polygons. Now hold left-click on the Subdivision Surface icon (the green icon) and you'll see a dropdown menu where you need to select Sweep from a panel of objects. Once you have added Sweep you need to drag and drop the spline previously made in the first step and the rectangle (spline) into it. You should get something that looks like the accompanying image.

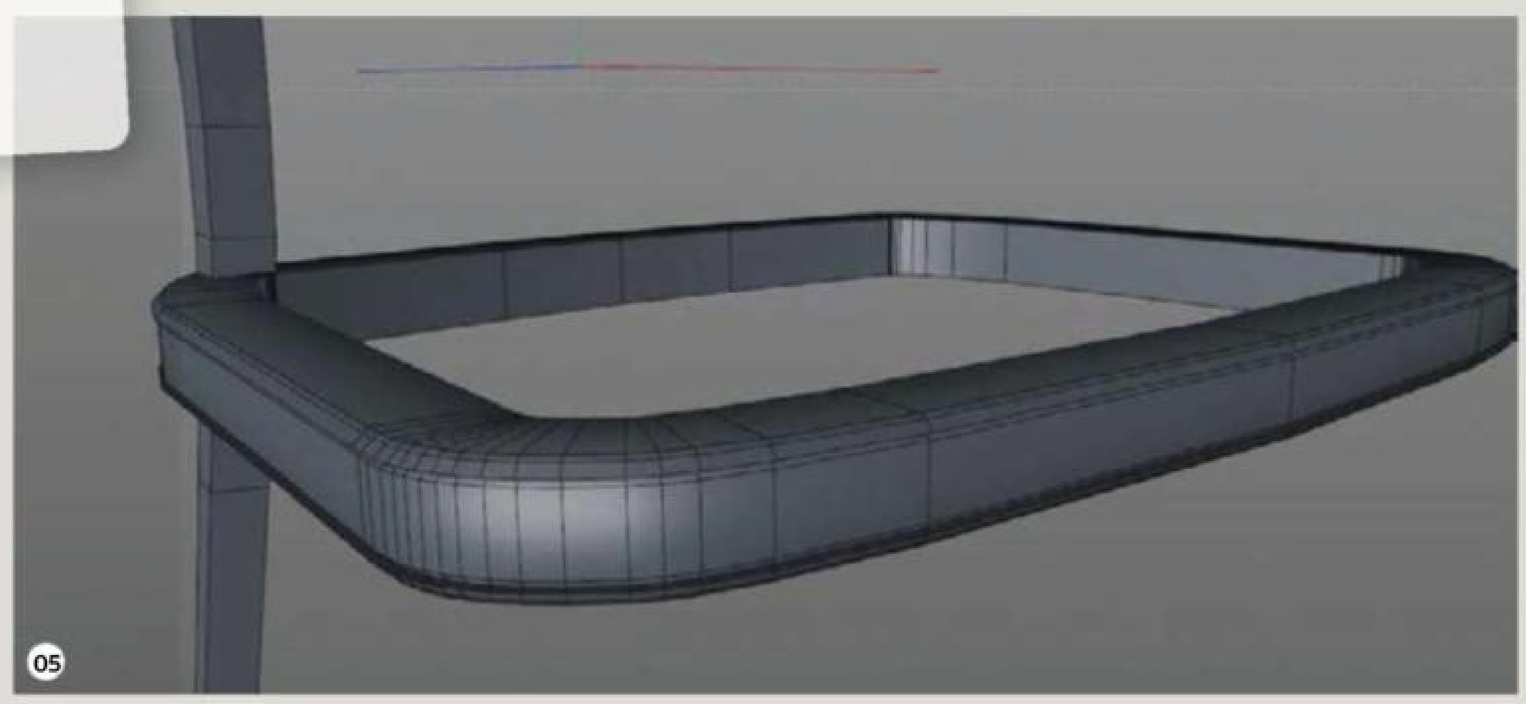
03 Work on proportions

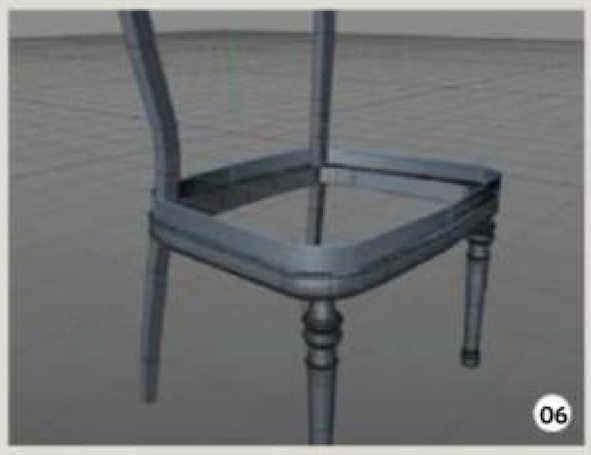
Select the Top view, then draw a spline using Bezier as in the attached image. Use Adaptive as the intermediate points. Now add a rectangle spline (W=40cm H=40cm) using the Frontal view. Add Sweep NURBS, drag and drop the spline previously drawn and the rectangle spline into Sweep NURBS. Now apply the Sweep NURBS with the splines into a new Symmetry object. Alter the Tolerance until you get a good weld between the parts on each side of the X axis.

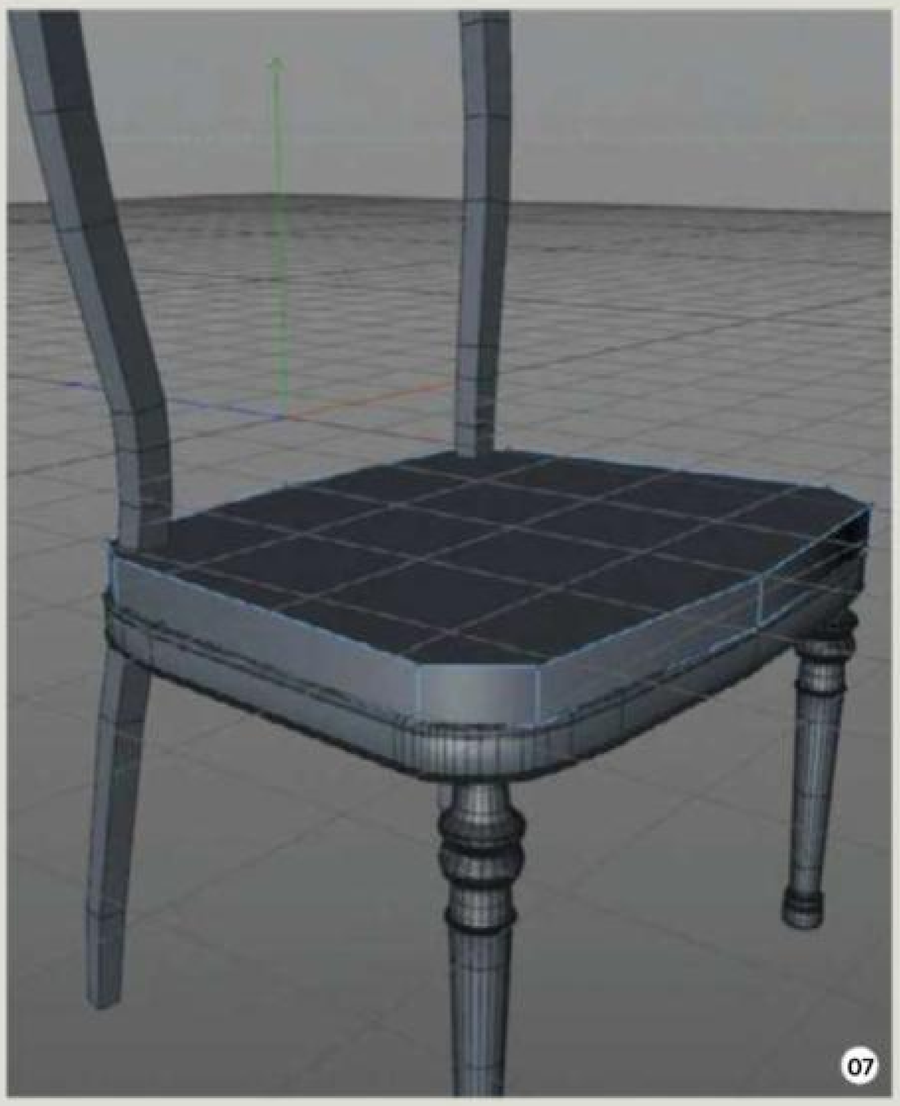
Recommended types of splines

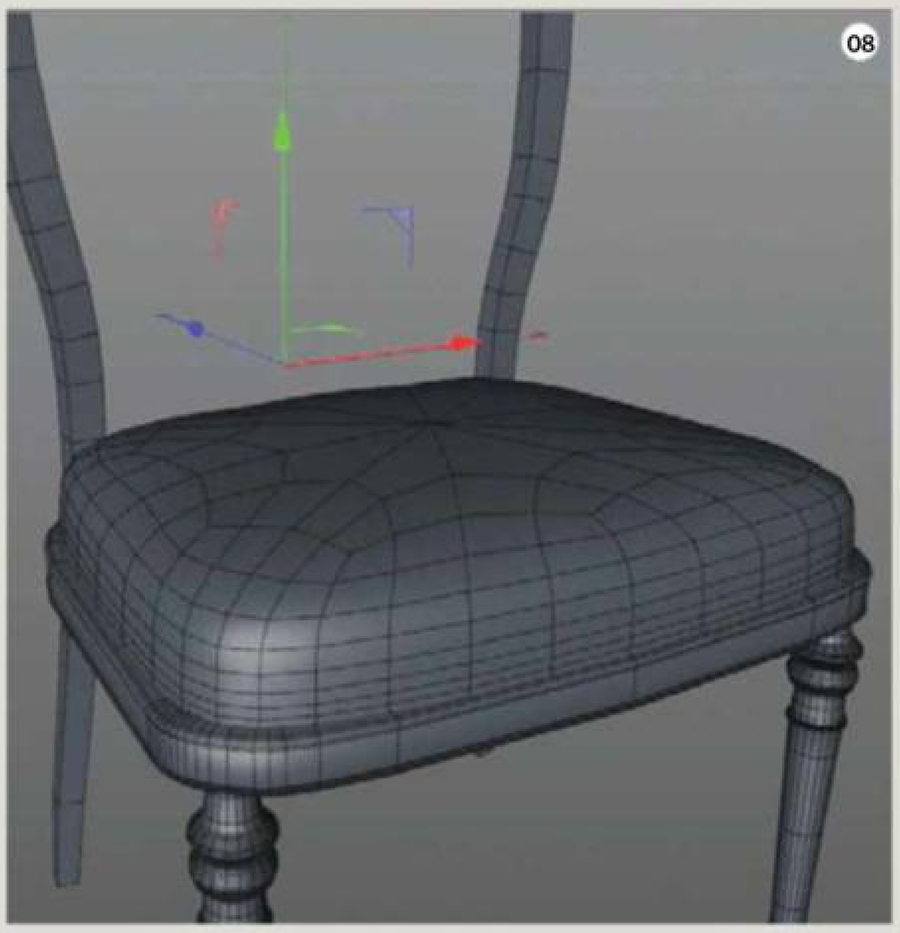
In this particular project we should use Type=Bezier and Intermediate Points=None. If you try different types of Intermediate Points you'll notice that other options will increase the number of polygons. We should keep the number of polygons as low as possible, so we can manipulate our piece without problems or make any changes easily. If you use other types of intermediate points, you'll increase the number of polygons and the manipulation will be impossible. This is why I prefer to use the Subdivision Surface object to increase the number of polygons in the final step.











04 Model the chair legs

Add a cylinder (Radius=10; Height=353; Height segments=4) and position it below the seat rim previously made, using the accompanying image as reference. Make this cylinder Editable and, using Extrude and Bevel, get a similar shape to that of the image. The process used here is better explained in the accompanying video tutorial. Once you've finished the legs, import this piece into a Subdivision Surface object. By applying Bevel you can add more edges near other edges to keep the original shape without getting a deformation. Add a Symmetry object to create two legs.

05 Add bevels to the frame

Convert the seat frame created in Step 3 to Editable then, using Edge mode, go to Select>Loop Selection, pick the edges of the seat frame and deselect the ends (holding Ctrl). Now you can just drag and drop to get a good bevel. Next, using Loop Selection and Polygon mode, you need to extrude the shape around the surface while trying to get a low relief.

06 Create the chair cushion

Now we need to create a spline around the seat frame. I used the same process as in Step 3, but in this case I used Mirror to duplicate the selection to the other side of the X axis with the following parameters for the Mirror: Co-ordinate System=World, Mirror Plane=ZY. Once you get the separated splines with the same shape on each side of the X axis, you need to join the vertex using Join Segment, which will enable you to close the spline. Add Extrude NURBS, then drag and drop the spline into it. Set Extrude NURBS Movement (0; 40cm; 0), but don't use caps.

07 Close up the holes

Now convert the previous Extrude NURBS to Editable mode and use Close Polygon Hole. You also need to close the upper hole (see the accompanying image). If you close the bottom hole you'll notice how the Subdivision Surface object added in the next step will deform the base. You can close the bottom hole with Subdivision Surface unchecked, then add a bevel in the bottom edges to create two edges. This means that the Subdivision Surface object can't deform the cushion.

08 Complete the cushion

Add another Subdivision Surface object, then add it to the Extrude NURBS that we created earlier. Doing this will round the surface. However, before heading to the next step, uncheck Subdivision Surface. Now, using Loop Selection and Edge mode, you need to add a bevel. This way the Subdivision Surface object can't deform the model. Switch to Polygon mode and select the polygon that you have created using Close Polygon Hole and move it upwards. Activate a Subdivision Surface object, then use Top view to help follow the shape of the seat frame.

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09 Model the backrest

Using the same process as for the chair cushion, we need to create a spline (Type=Bezier, Intermediate Points=None), following the backrest shape as in the current image, and add an Extrude NURBS object. Add the spline previously made into it. Use Extrude NURBS Movement (0; 0; 60cm), don't use caps and convert this object to be Editable.

10 Bevel and adjust

Close the polygon holes (both the back and front). Using Loop Selection and Edge mode, select the edges around the rest and add a bevel around it. It's important to keep the original shape during this stage. Apply a Subdivision Surface object, then add the Extrude NURBS created previously into it. You'll likely need to adapt the points over the backrest, so when you activate the Subdivision Surface object it will retain the desired shape.

11 Work on the armrest

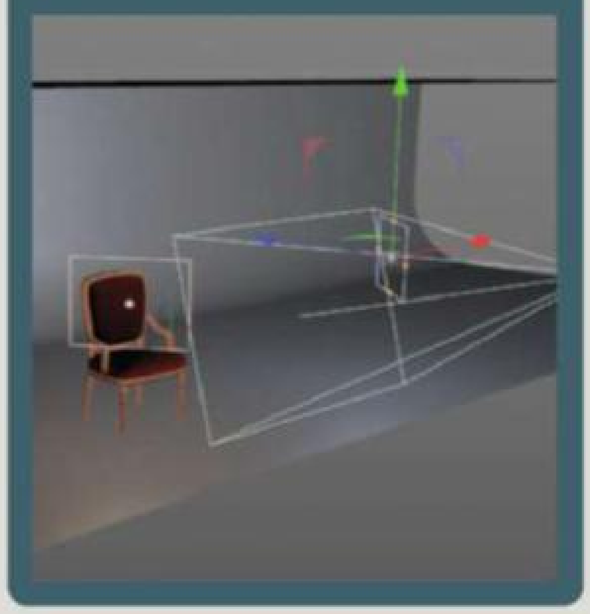
To complete the armrest element you need to use the same process previously used for the Sweep NURBS objects. Create a spline following the shape of the armrest, then add a Rectangle spline (W=36; H=28). Apply another Sweep NURBS and add in all the splines you previously made. Try to adapt the spline following the current image. Now add a Subdivision Surface object (Sub.level=2) to increase the subdivision level of Sweep NURBS.

12 Final details and render

Once you've completed all of the previous steps, you can start experimenting with the ornamental details, as you can see in the current image. These will bring out greater realism in the final result. By using Sweep NURBS and Cloner, we can attach new decorations over the mesh. Try searching for reference for new ideas, and perhaps try out some alternative ideas to those displayed here. Experiment! Finish by applying materials and rendering.

Final rendering and lighting of the scene

In the final rendered scene you can create studio lighting with a simple open rectangle and two lights in front of the chair, as well as a camera to focus on the main object. After this you need to add Ambient Occlusion and Global Illumination (Render Settings>Effects). Now you need to assign the materials to each part of the chair. I used a list of three materials that you can find in CINEMA 4D (Presets>Prime> Materials>Misc). Studio lighting can be achieved in a variety of ways, however, so experiment to find the best results.



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Michael Levine
www.michael-levine.com

Michael has worked in the VFX and animation business for over 16 years, at companies such as Disney, Sony and ILM. He specialises in character hair and cloth simulation.

LightWave
Eugenio Villarreal
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Eugenio is a graphic designer, environment artist and matte painter. He specialises in using LightWave and Photoshop and here reveals how to create quick CG concepts

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Tutorial files:
- The Maya scene file
- Movie file of animated hair

Maya, nHair

Add a light breeze to hair

"How can I apply breakup and wind effects to simple hair simulations?"

CG work can easily look fake and evoke a dead appearance if something isn't moving. Often we can take for granted the subtle movements occurring all around us. One of these is a slight breeze passing through hair, which can add a nice touch of life to a scene, or highlight a dramatic moment. However, getting wind to animate CG hair can be tricky, as it's easy to have something look fake by being either too still or too much in motion!

The fastest way to animate wind through hair is to use Maya's built-in nucleus Wind Speed with Wind Noise, but this leads to a flat and uninteresting look. What you want is for the hair to have a little breakup when the wind is at its strongest Magnitude setting. The best way to achieve this is to use multiple dynamic fields together. Applying a Wind field and a Turbulence field at the same time will give you finer grain control over your simulation.

An Air field enables you to control the Direction, while the Turbulence field will handle the internal breakup of the hair. By keeping Direction, Turbulence and Frequency as separate values, you can attain a specific look for the simulation.

Complex hairstyles can be time-consuming to simulate, but even more so with dynamic forces in play. You'll want to turn down the overall resolution of your hairs while iterating the simulation, holding back the full-resolution hair for when you are closer to finishing your animation.

In production there is usually an approved neutral hairstyle or groom that needs to keep its overall look. In animation this is sometimes referred to as on-model. It's vital to keep the art direction of the hairstyle, but have it move realistically at the same time. The goal is a little movement, but not too much. You don't want it to look off-model. Use the Start Curve Attract attribute to bring your simulation goal back to the starting position of the hair. When you're happy with the simulation, cache it out to disk with nCache>Create New Cache.

Blender

Jonathan Williamson
http://cgcookie.com/blender

Jonathan is a modeller, sculptor and topology specialist who likes to dabble in everything CG-related. He teaches Blender online at CGCookie on a day-to-day basis

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01 Set up the Hair system

Start by setting up the basic hair rig. Select your curves and your character's head, then go to nHair>Make Selected Curves Dynamic. Make sure you select the Snap Hairs to Head checkbox. The default nucleus settings should be fine for getting a feel for how dynamic fields will affect your hair sim. You can make your head mesh a passive collider and add 30 frames before the start of the animation.

02 Add a Wind field

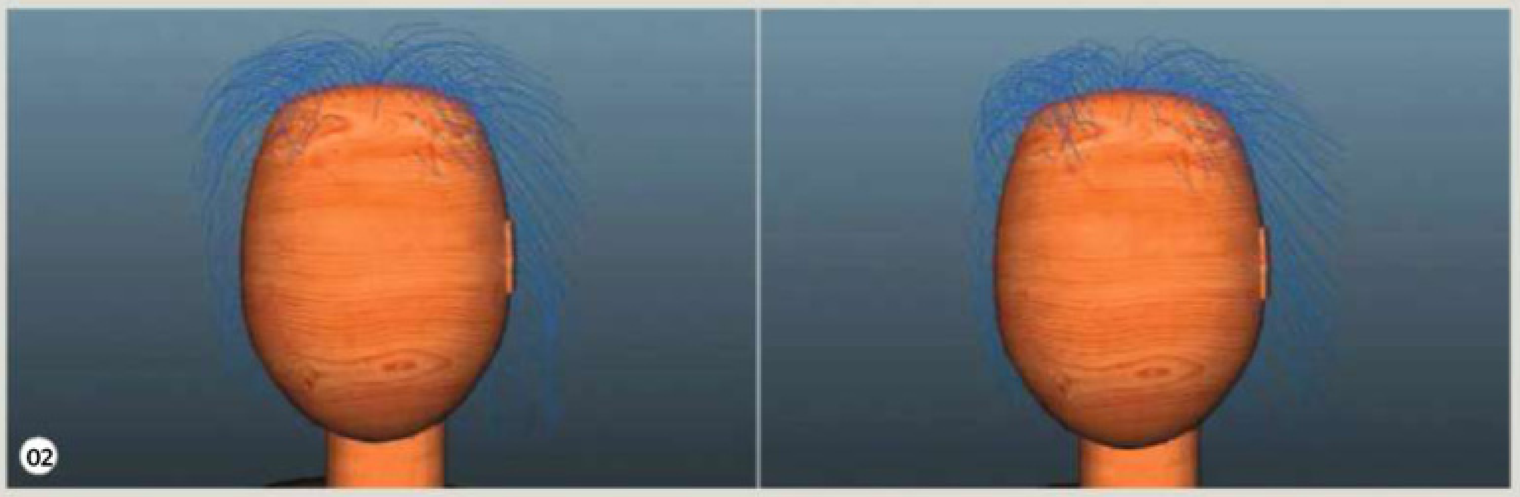
Now create a Wind field and connect hairSystem1 to airField1 in the Dynamic Relationships editor. Adjust the Air field's direction to point to where you want the wind to go. By default this will be blowing straight down the Y axis. Turn Use Max Distance off for now and set the Magnitude to be the amount of wind you want to see. Make keyframes for the lowest amount of wind every 50 frames. This should leave give a gentle curve shape in the Graph Editor.

03 Add a Turbulence field

At this point the hair is moving in a slight breeze, but the movement is very regular. What we need is to add just a little turbulence to the hairs at the moments when the wind kicks up. Add a Turbulence field and connect it in the Dynamic Relationships Editor as we did with the Air field. Now select both fields in the Graph Editor and make their curves somewhat in concurrence with each other. Staggering the Amplitude from the Wind Magnitude curves will increase breakup of hair clumps when the wind is strongest, adding realism.

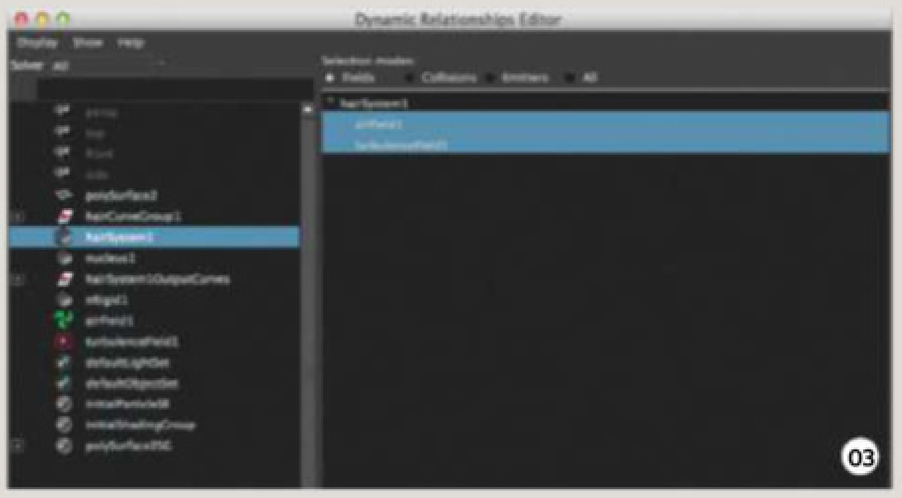
04 Apply some turbulence

Turbulence is best used in small amounts, so be careful with the Noise Level setting. Putting the Magnitude too high can freeze your entire workstation, so start with the defaults and move up from there. Keeping the Turbulence set as low as necessary will also speed up simulation times. Only adjust one setting at a time so you can understand its effects on your character. If you change multiple values at the same time it will be difficult to find out exactly which ones are responsible for the simulation's overall look.



Don't have nHair?

Although this tutorial was created using nHair (in Maya 2013 or higher), dynamic fields will still work fine with older versions of Maya using the Classic Hair system. However, nHair is far better at collisions and easier to incorporate into a character workflow with clothing. Using nucleus also enables your character's hair and clothing to interact with each other.

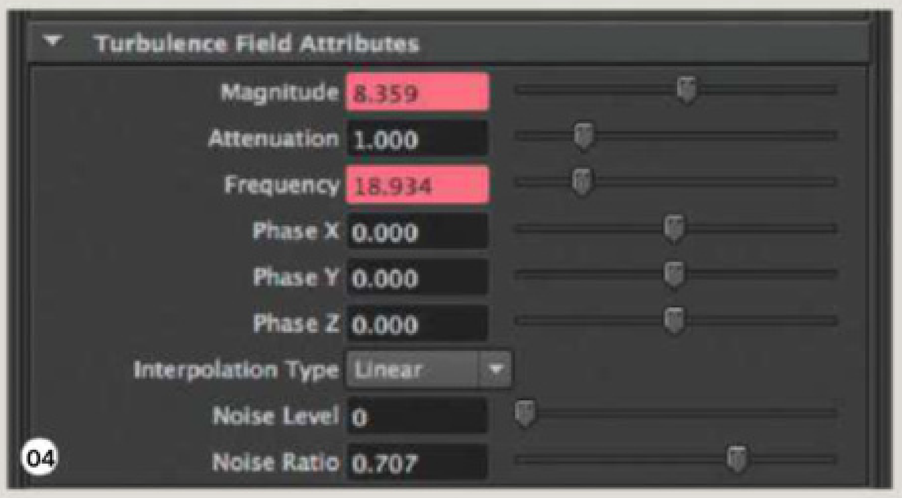


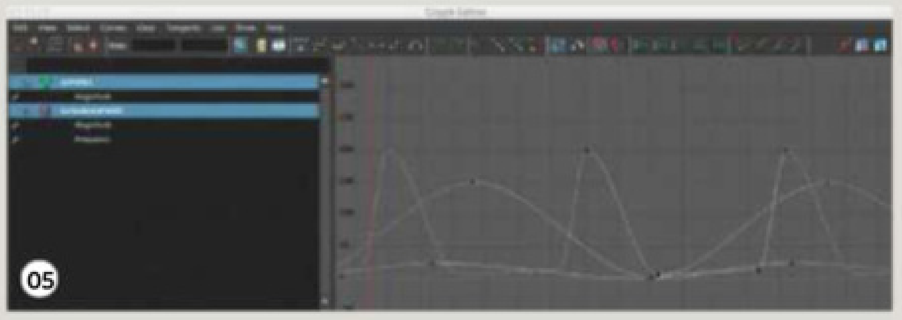
05 Alter the Frequency

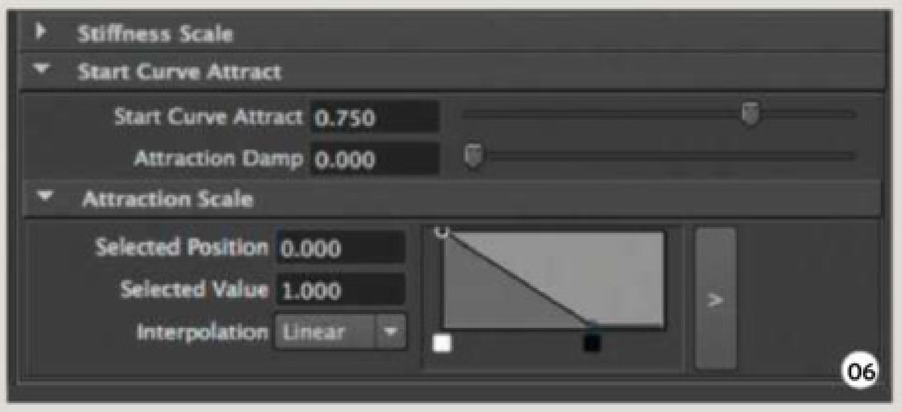
The final sweetener is adjusting the Turbulence Frequency setting in the Turbulence field. Animate the value so it pulses on quickly during the few moments when the other settings are at their high points. This will add a very subtle breakup to the ends of the hair tips, adding to the natural feel of the simulation. The difference between too much and not enough is highly subjective, and the size and shape of your character will also affect the values, so play around to see what works best for you. Try looking at reference material too.

06 Maintain the groom

It can be difficult to have wind animating your character's hair while at the same time maintaining the look of the hair groom. If you find that your character's hair groom is being overwhelmed by the wind animation and is losing its shape, try raising the Start Curve Attract attribute in the Hair system. This will make the hair stick more to the base groom, but will come at the expense of lessened movement. Use the Attraction Scale graph setting to determine how strongly the hair will attract to its goal shape. The graph values are root (0) to tip (1).







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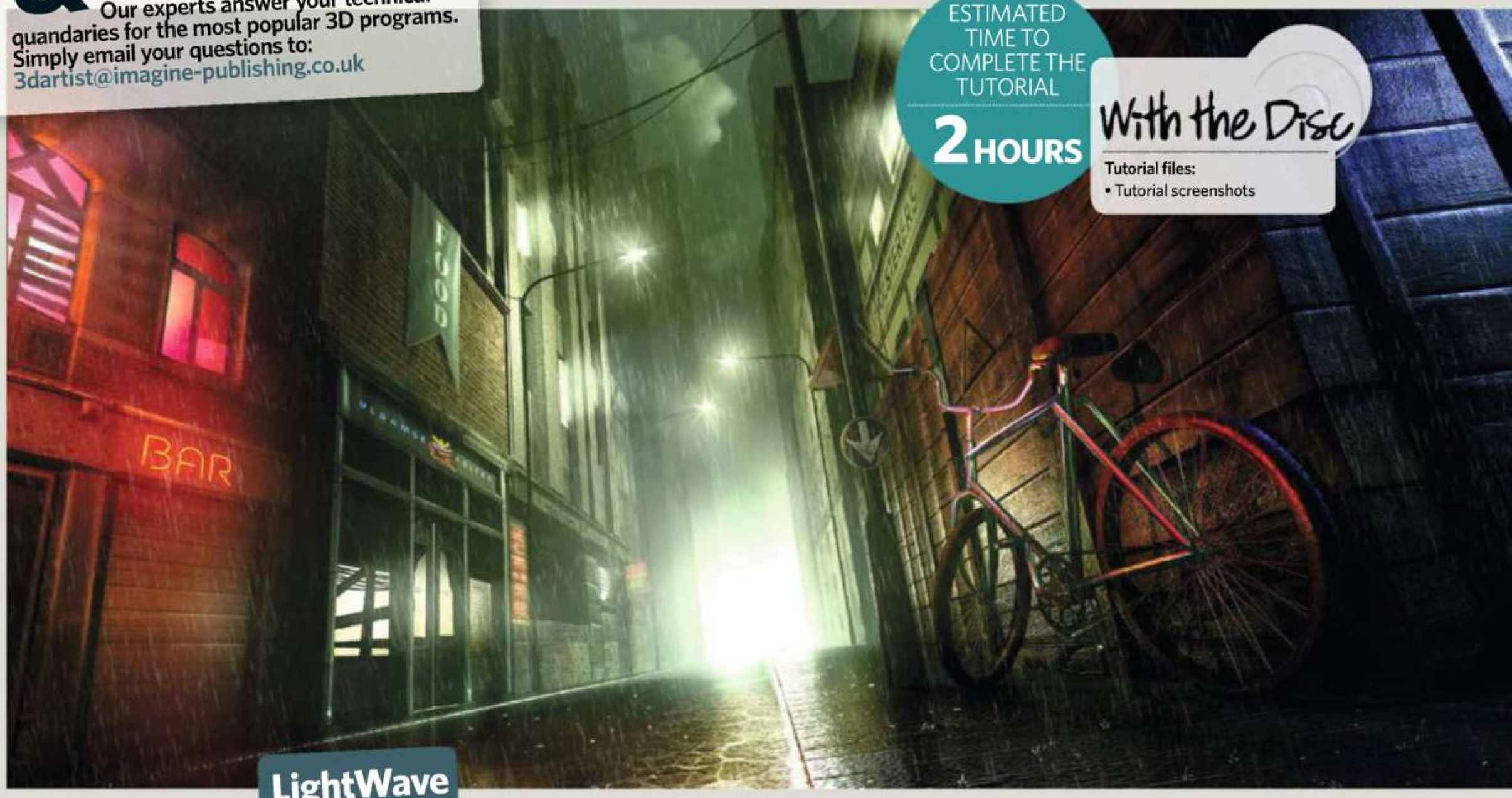


ESTIMATED TIME TO COMPLETE THE TUTORIAL
2 HOURS

With the Disc

Tutorial files:
- Tutorial screenshots

LightWave

Create concepts in LightWave

"How can I quickly and easily generate concept art in LightWave?"

LightWave is a great tool for producing an easy and efficient 3D base for concept art. Even with basic modelling and texture skills you can quickly build 3D scenes that can be edited in Photoshop later on, to add final details and colour-correction.

Solving the perspective of a scene is usually a difficult aspect of the drawing process, so by using LightWave you can avoid this problem in your concepts.

First you will need to gather your references. For this example I found good references on Flickr using the Creative Commons search option. It's then advisable to sketch out your ideas to get a sense of perspective and composition.

In the modelling stage you'll find that basic primitives are great for starting the 3D sketch, then later refining some objects such as the buildings with the Knife and Bandsaw tools. In this case I avoided using UV-mapping since this is concept art, so I used planar- or cube-mapping instead.

During these initial steps you'll also learn how to use a backdrop image to detail some of the foreground buildings, applying the Knife, Bevel and Multishift tools.

Later, when researching textures, we'll use one of my favourite sites: CGTextures. Since the image is a derelict alley, we'll search among the Derelict Building textures. Don't be too concerned about sizes or colours, as we can bring in nice details with Photoshop later.

In Layout we'll look at creating a mysterious atmosphere with a coloured gradient background and area lights. We'll also cover how to make some shaders for the wet effect of the overall piece.

In the final render we'll explore the best format for post-production, including my preferred method. You will also find some advice on camera settings, as well as adjusting focal length.

Finally, to finish the post-production step, I'll discuss the best Photoshop tools you can use to bring details to the raw 3D image, using blending modes and some matte-painting concepts to be combined with the 3D base from LightWave.

The following is a workflow I developed to make fast concepts and sometimes even final images. Following these steps will help you save time when using LightWave for your own concept projects.

01

01 Gather reference images and start sketching

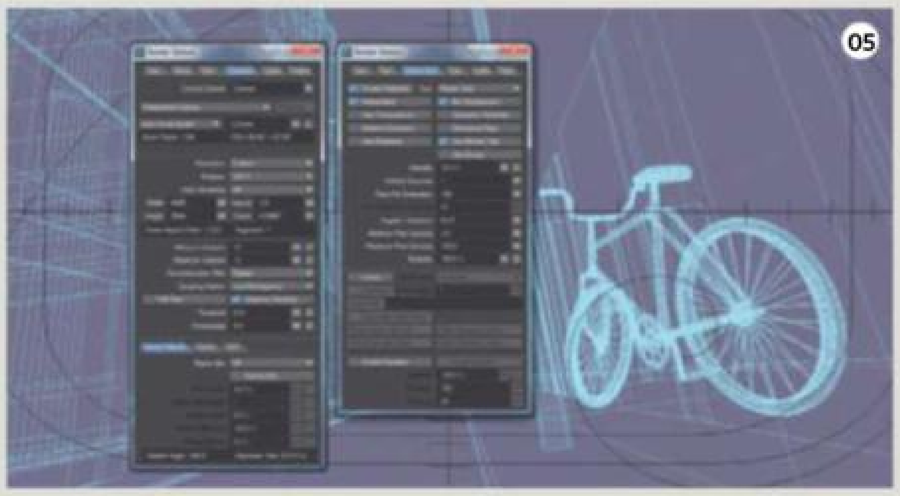
To begin I recommend using paper and pen to start sketching the brief that the client has brought to you, or whatever it is you are planning. With the help of photo references you can get a base to start the 3D modelling. A good source for photo references is Flickr and Google – you can find great images of all sizes and sometimes with the Creative Commons option you can find free images to use commercially. I use Photoshop to make my final sketch in greyscale, as this helps me keep things as practical and smooth as possible.

02 Begin modelling and sketching in 3D

Next, start inserting planes and boxes, as this will help us arrange the main 3D sketch base. Use box-modelling techniques for the plane and subdivide it in Faceted mode to bring out the sidewalk. For the bike, use boxes and cylinders and activate the Spline Guide tool to make the bent tubes. Shape the wheel with Radial Array to make the complete circumference. As this is only concept art, you don't need to go overboard on the details. With basic sketching done, send everything to Layout to view the camera arrangement and fix the geometry.

03 Search for textures and include them in the scene

When applying textures, it's important to find a decent source. You can either take your own pictures or locate a credible resource site, such as CGTextures. Find a few derelict-style textures for the basic geometry, then later you can polish some foreground models and bring details from the texture. Apply the texture as a backdrop, model a box of the size of the image, then cut details such as windows and columns with the Knife tool. Apply the Multishift or Bevel tool to make some displacements in the very simple geometry.



04 Add further details and conjure atmosphere

For a dark, cloudy and mysterious mood, use the background gradient to give the scene nice colours that react with the Radiosity in LightWave. For the lamp poles, use point lights with linear gradients and apply an area light at 250% with the Linear option for the main light. To get specular reflections in the ground, apply simple road textures with Multiply mode in the street and sidewalk, with added reflections to give off a wet surface look. Add some Linear Fog with the Background Color option to complete your 3D base render.

05 Render and move to post-production

With all the textures and shaders ready, fix the camera in the final position, find a good composition, then adjust the focal lens at 14mm to give a more dramatic feel and a greater sense of scale. Set the Radiosity at 60% for increased contrast, then render the image with Anti-aliasing at level 12. Later in the process, you can opt to make an extra Alpha channel pass for the bike to colour-correct it separately. This particular render took 15 minutes at 6,000 x 3,500px and 72dpi.

06 Finalise in Photoshop

To finish the image, you can use a lot of colour-correction and apply the Dodge tool with a small brush to bring in little details such as highlights and lights in the windows. Apply brushes to increase the fog effect, as well as a sense of depth. Add a top layer with photographic rain to complete the wet effect, then activate Levels to get nice contrasts. Also add Photo filters to unify the colours and use some PNG textures of signs and neon lights to bring in final details. Use an Unsharp Mask pass to get some crisp detail and finally insert some textures with blend modes to produce nicer surfaces.

Be practical with your concepts

As you can see, LightWave is a great tool to make concept art – the level of detail you apply in your 3D steps is entirely up to you. Since this was for a quick concept piece, I kept the details in the 3D scene to a minimum and later added important details in the Photoshop stage. Remember, the use of keyboard shortcuts is a great way to increase your speed. Find time to learn the basic tools, including the selection tools in LightWave. This tutorial can be applied to exterior and interior scenes that don't have many organic models.

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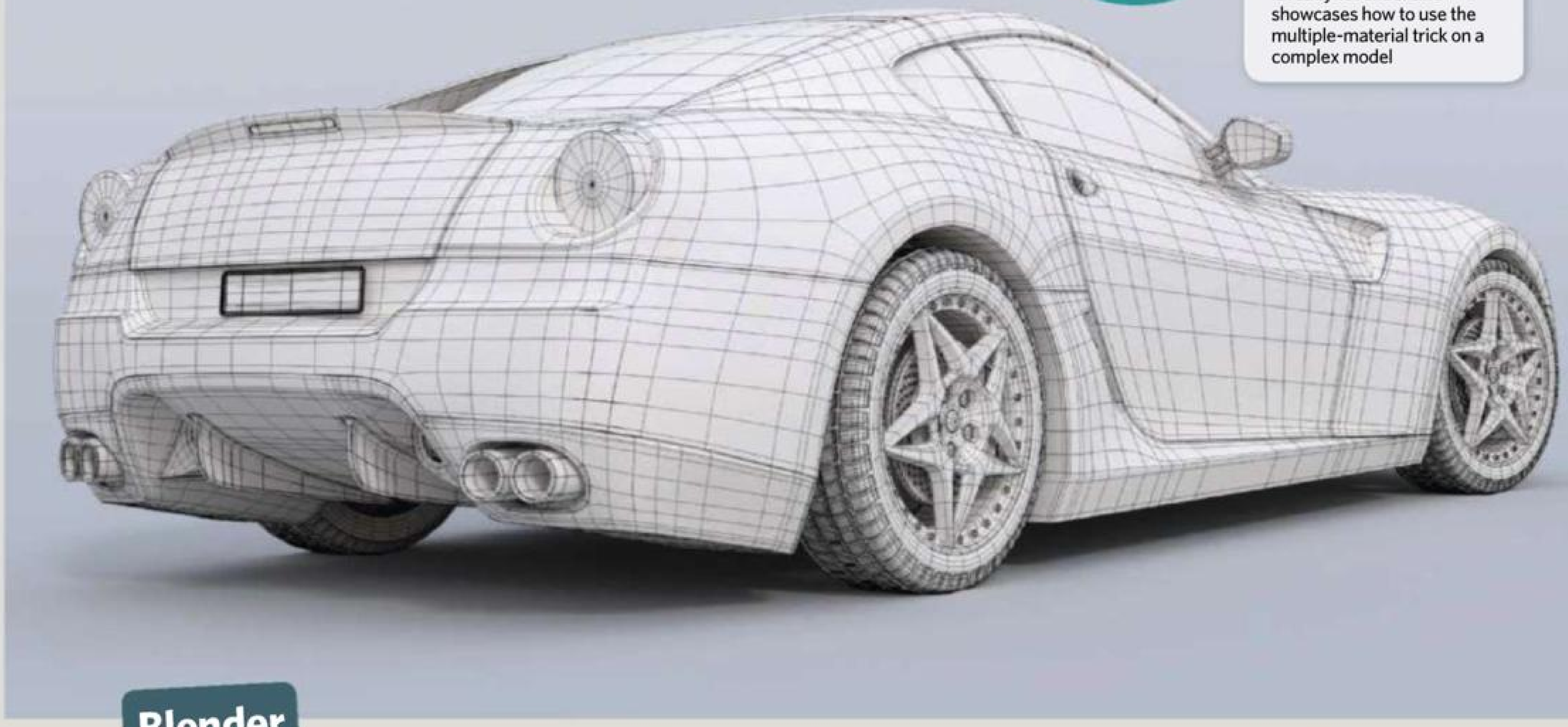
Tutorial files:
- The .blend scene file. This file is ready to render and showcases how to use the multiple-material trick on a complex model



Blender

Render wireframes in Blender with Cycles

"How can I create professional-looking wireframe renders in Blender using its Cycles feature?"

Rendering wireframes in Cycles can be done using a few different methods. One option is to use the Wireframe Input node within a Cycles shader node tree. Alternatively you can create actual wireframes via the Wireframe Mesh Operator in Edit mode. Additionally, you can combine your Cycles render with a Blender Internal render through the compositor.

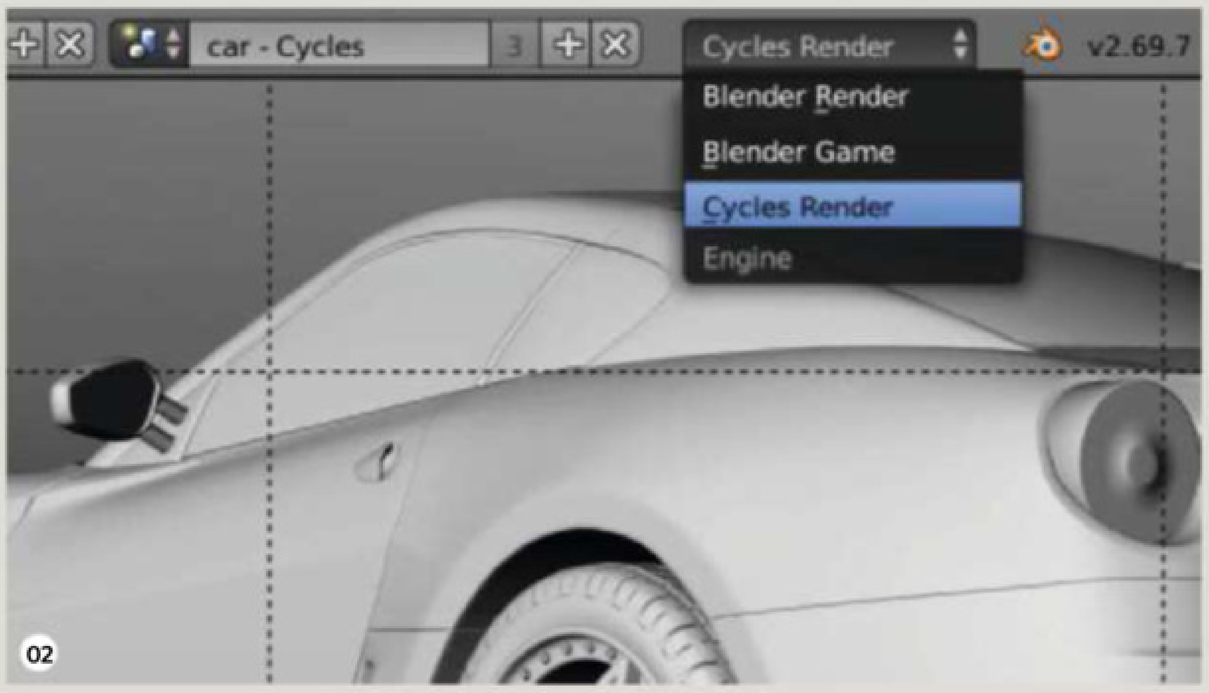
The first method, using the Wireframe Input node, is the simplest – it also renders everything in triangles at the highest subdivision level. However, this tends to result in a very messy-looking render and it's not very flexible. With the second option, you can have a great level of control, but it relies on actual geometry, which can become expensive very quickly and also clutters up the scene. In light of these two, the third option, combining your render with one from the Blender Internal, is my preferred way to create decent wireframe renders. By compositing two renders you can create excellent results and keep a fine level of control over the final effect. It's also quite easy to set up.

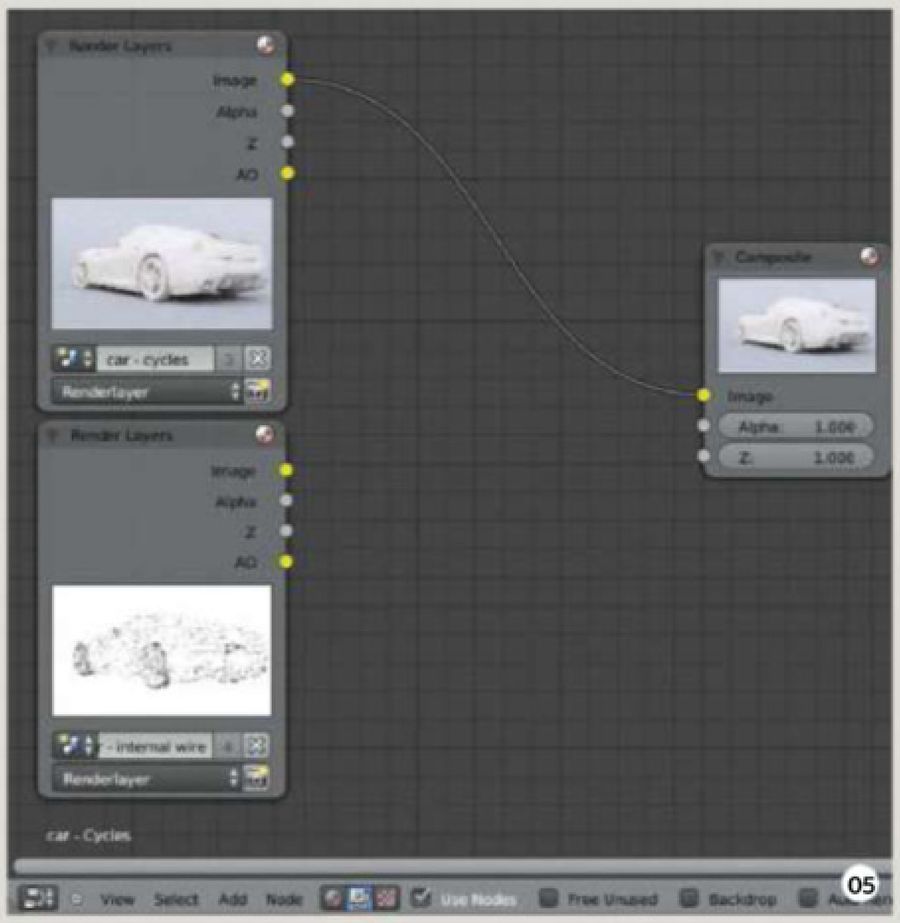
The Blender Internal method just takes a few steps, but to make the process manageable we'll utilise Blender's scenes, duplicates of our model(s) and a series of materials. We'll need a material for the base material, the wireframe material and a white matte material. Last, we'll need to set up a simple compositing node tree to combine the two renders together from each of the render engines.

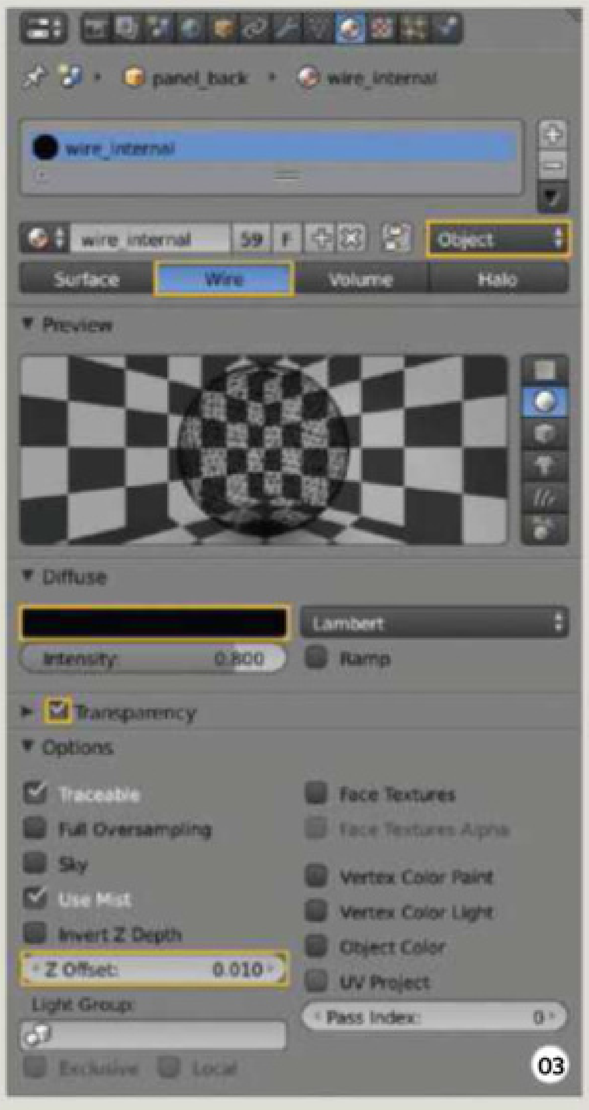
The benefit to making wireframes this way is you can take advantage of Cycles' powerful node-based shader system.

01 Duplicate objects to a new scene

The first thing to do is create a new scene and duplicate or link all of your model(s) into it. Duplicating objects is the most flexible method, but linking them can be more convenient as it'll use the same mesh data for each instance of the model in each of the scenes. In this case, I've chosen to make a new scene with linked objects, as this way if I ever change something in the mesh, the changes will propagate across both scenes.





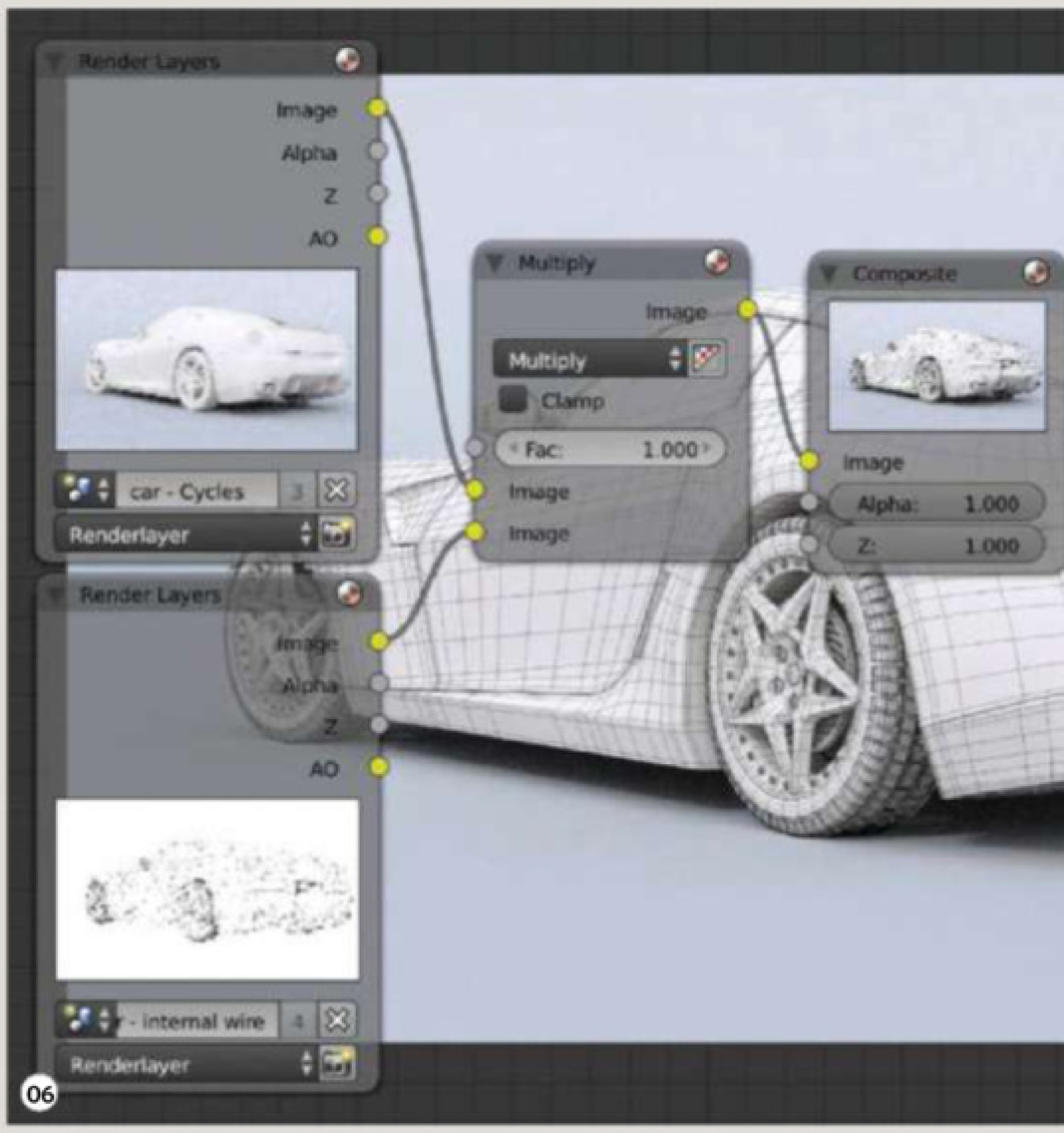


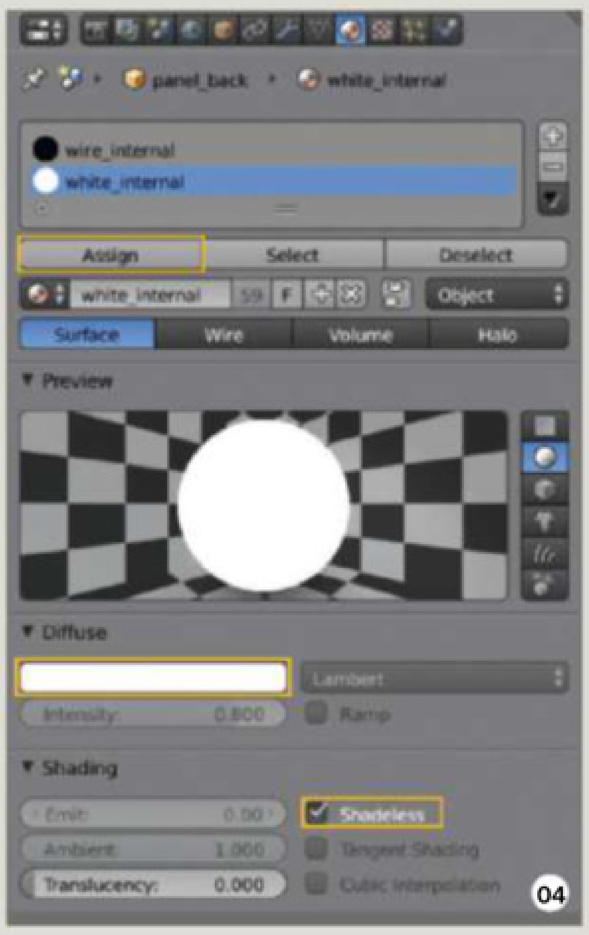
02 Set the render engines for each scene

Once both scenes are created you need to specify which render engine to use for each one. The first scene, which will be used for actually rendering the model, should be set to Cycles. The second scene, which will create the wireframe render, should be set to Blender Render (also known as the Internal Engine).

03 Create wireframe material for second scene

Next it's time to create the wireframe material in the second scene, (which should be the one set to Blender Render). The first step (and most important part if you've chosen to link your objects) is to change what the active material is linked to. Materials can either link to the data of an object, or to the object itself. When the link is set to Object, you can use a separate material for each instance of that object. In this case, I'm setting the link to Object. Now you need to make a new material, since changing the link to Object has emptied the active Material slot. On this material set the type to Wire and the Diffuse colour to black. You should also enable Transparency and increase Z Offset to something around 0.01.





04 Produce white matte material for the frame

Now repeat the previous steps for the white matte material, but this time leave the type set to Surface, set the Diffuse colour to white and then enable Shadeless. Also, go into Edit mode, select the whole mesh, then press Assign in the material. This material will be used to tell the compositor what to ignore, as we'll be multiplying the black wireframe over the Cycles render. While creating this material, it's also a good idea to set the World Background Color to white as well, or you may find it slightly conflicting later on in the process.

05 Render both scenes

Once the materials are created and added to each object for rendering, it's time to actually render both scenes. Since we're using multiple scenes, this is most easily done from the compositor. Switch over to the compositor, then go to Input>Render Layer Node for each scene, then specify the scene from the dropdown menu on the node. To render a specific scene, just press the Camera icon on the Render Layer node.

06 Composite the two renders together

Finally, to put it all together we need to multiply the wireframe render over the Beauty render. This can be done by adding a Color> Mix Node and then setting the Blend Type to Multiply. This method is not as fast to set up as some alternatives, but it tends to yield the best results with the most flexibility.

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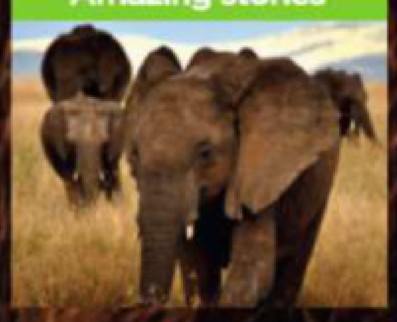

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Cornelius Dämmrich
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Username: Eimer

Website www.zomax.net
Country Germany
Software used CINEMA 4D, V-Ray, Photoshop, ZBrush, Unfold 3D, Marvelous Designer

Haze 2013

This image illustrates the idea of a stylised panopticon of someone's life, like a broad showcase with the arranged belongings and emotional possessions of some random person gathered in a single room. The idea evolved over the process of the image's creation. At the start I was just making a kind of virtual boy's room, where someone could go and work all night long, dreaming, building and so on.

> I made a second version of the whole image for the Fog pass, deleting all materials and using a 100 per cent black Diffuse material as the override material for the whole scene. I used a comp tag to give the geometry an Alpha Distribution of -1, which cut the darker shadow parts out of the Fog pass

'Alma' (directed by Rodrigo Blaas) was a big challenge for Maxwell Render, with a more cinematographic workflow that used reflectors and diffuser panels for aiding the storytelling through lighting
© www.jonatancatalan.com

Maxwell Render V3

With a long list of new features and improvements, is this the most complete version of Maxwell Render we've seen so far?

REVIEW BY Jonatan Catalan Navarrete, look-dev, lighting and shading artist, Spain

Being a user since the first Alpha version of Maxwell Render 1.0, I can't remember a new release of the software more exciting than this latest offering. In this third iteration, the Next Limit team has improved the solid base of Maxwell in all senses.

I'm a look-development, lighting and shading artist, so in my work I need a render engine with a fast and simple setup. I can't spend my time dealing a long list of settings and predictably I don't want to assume a percentage of error after a night of rendering. In other words, I don't want surprises. Thankfully the latest version doesn't present any – at least in its quality and accuracy, Maxwell V3 is totally unrivalled. Furthermore, considering my requirements of speed and error-free rendering, Maxwell V3 offers much more besides.

First let's look at the improvements and optimisations included in this new iteration. Previously in Maxwell we had some really cool features like Physical Sky. It was the first commercial renderer that added this feature and it was something that helped a great deal when looking for a fast result in our scenes. However, it was also somewhat limited. For instance, what if we wanted to control the position, colour or intensity of the Sun? Now we can do that and more thanks to the Custom Sun Radius control. The sun in Maxwell's Physical Sky system is now cusomisable in size and intensity, and introduces a physically correct approach to controlling shadow softness or distant emitters with parallel shadows.

There are many more improvements such as the FIRE render preview (Fast Interactive Rendering). Here we can move objects and the revoxelisation is calculated only in the objects that have changed, displaying your changes instantly in a floating window thanks to the new GPU-accelerated display. Finally, we can now also create image projectors that open up worlds of possibilities. This includes the ability to use blockable emitters to isolate each emitter to each individual object. It's a very welcome addition indeed.

This is just a short list of some improvements that really make for a much more intuitive setup, but there are some great improvements to speed too. Motion blur is now supported in big scenes – impressively, even in scenes with millions of hairs, the increase in speed can be upwards of 100-times as fast.

Regarding new features, we know that Maxwell Render is based on reality, but V3 makes huge leaps forward with regards to

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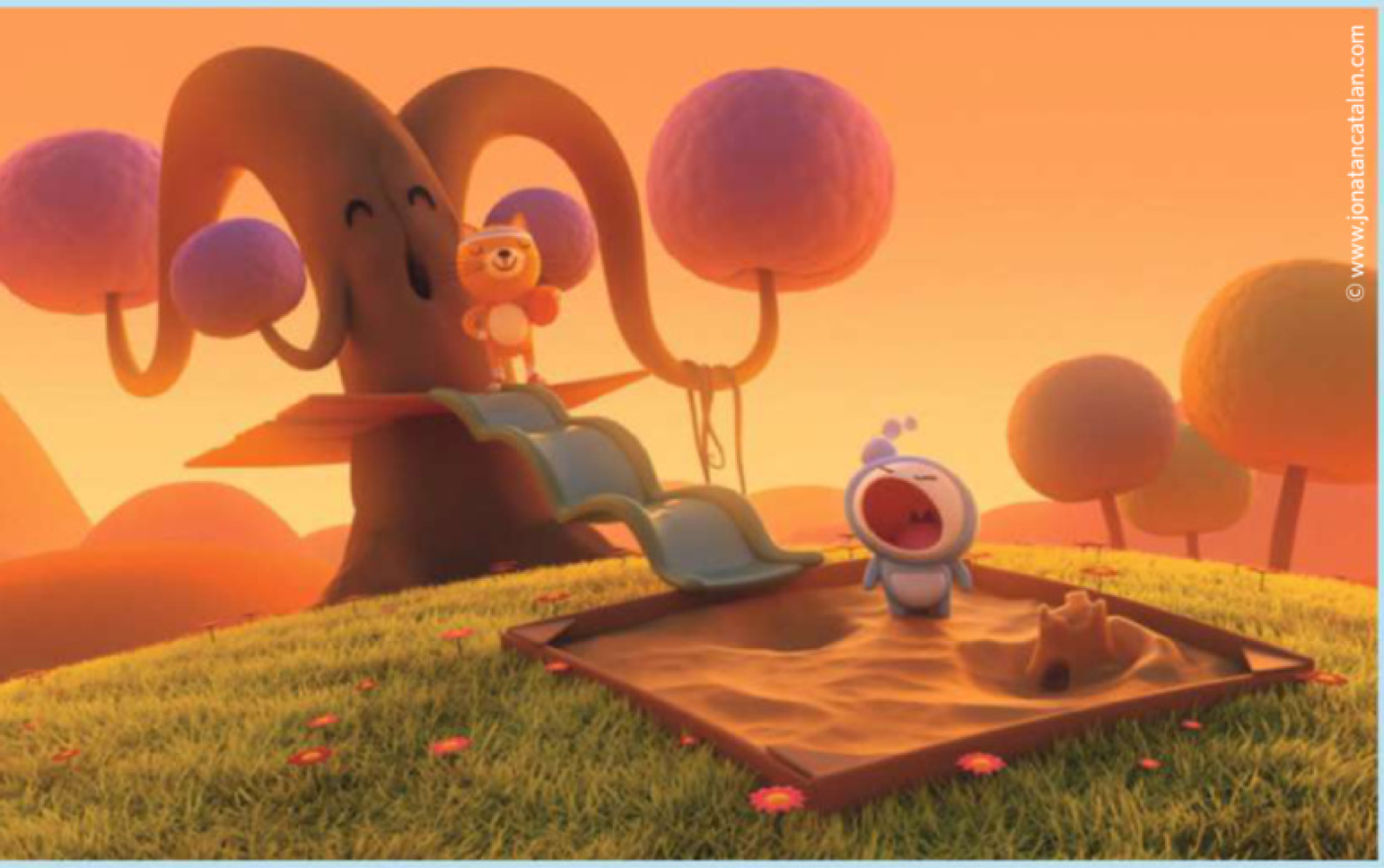

This image shows that even when using physically based rendering you can still achieve a colourful and cartoon style

Motion blur can now support much larger scenes than was previously possible, handling potentially millions of elements faster than ever

the atmospheric and fog effects. There's a new Volumetric feature in Maxwell, which can work in several ways: as a constant density volumetric object or with particles in several formats, including RealFlow BIN and density fields/voxels from Maya or Houdini.

This Volumetric feature is full GI, and when used can produce volumetric lighting refracted in a sphere or reflected in a mirror, impressively working with all features at the same time, such as motion blur, depth of field, hair and fur, displacement and so on. One of the most impressive things for me is that the volumetric lighting works with the indirect lighting too, so you can see an object illuminated when it's near a ray of light in a dark room thanks to the indirect lighting.

The list of new features continue with the new subdivision method, based on Pixar OpenSubDiv; a collection of procedural textures; Alembic support; support of Deep Compositing; the new Maxwell Sea and Scatter; five new lens types such as Spherical or Orthographic...the list goes on with awesome new features and improvements. If you're looking for physically accurate and stunning renders turned around quickly, look no further than Maxwell Render V3.

Essential info

Price: $775 US (approx. £472*)

www.maxwellrender.com

OPERATING SYSTEMS

- Windows XP, Windows Vista, Windows Server 2008, Windows 7, Windows 8
- Mac OSX 10.7 and up
- Linux 64 (x86_64 distribution with a 2.6 Kernel and glibc 2.5)

OPTIMAL SYSTEM REQUIREMENTS

- 1GB RAM minimum. 4GB of RAM memory is highly recommended
- 2GHz Intel Core2 processor, AMD Athlon 64 or better (Windows/Linux)
- 400MB available hard disk space for installation
- Accelerated OpenGL drivers

Maxwell Render V3 now comes with a new Volumetric feature that can handle a constant density volumetric object or various formats of particles

The good & the bad

- ✓ Quality and accuracy
- ✓ No tricks or approximations – works as a real-world and correct renderer
- ✓ Render settings are not confusingly abstract
- ✓ Artist-friendly workflow
- ✓ Supports plug-ins for over 15 vital 3D applications
- ✗ Steep learning curve for custom shaders
- ✗ Long render time with complex indirect lighting
- ✗ Subsurface Scattering parameters initially hard to understand
- ✗ Still no support for Yeti from Peregrine Lab

Our verdict

Features	9/10
Ease of use	8/10
Quality of results	10/10
Value for money	8/10

"A solid new version of one of the most advanced render engines the industry has to offer"

Final Score 9/10

* Price conversion correct at time of printing

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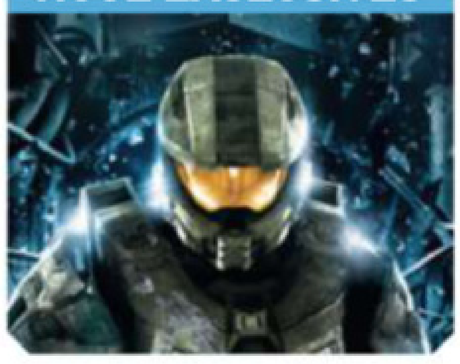				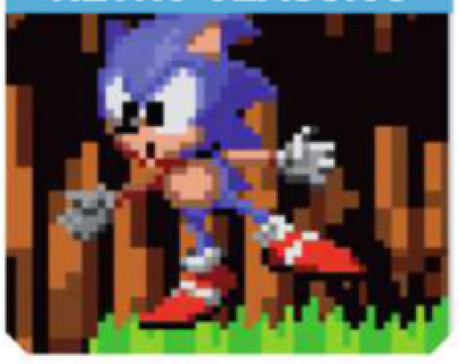

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X-Particles 2.5

If you have ever found Thinking Particles daunting, then X-Particles is the plug-in for you

REVIEW BY Patrick Goski, CINEMA 4D trainer and 3D modeller, Canada

X-Particles is a fully-featured third-party solution for particle simulations within CINEMA 4D. With a flexible, object-based workflow, as well as a complete nodal solution for those more comfortable in Xpresso, it lets you choose how you want to work. Impressively, with the new 2.5 version the team at Insydium has provided current users a huge, free update.

Starting with particle creation, you can now emit particles using Defined Emissions to quickly create grids or other organised structures in space. Along the same lines there is a new edge emission mode, enabling you to create evenly spaced particles along polygon edges. It's easier than ever to use these new modes in conjunction with support for the MoGraph effectors, which can produce interesting backgrounds or even futuristic interfaces.

Expanded support for texture-based emissions enables the use of smooth gradients rather than a simple black-and-white threshold. This means that you can now use the intensity of a material channel to affect the density of particle emission, controlling the overall sharpness with a Contrast slider. This helps to avoid the sharp breaks that occurred in previous versions.

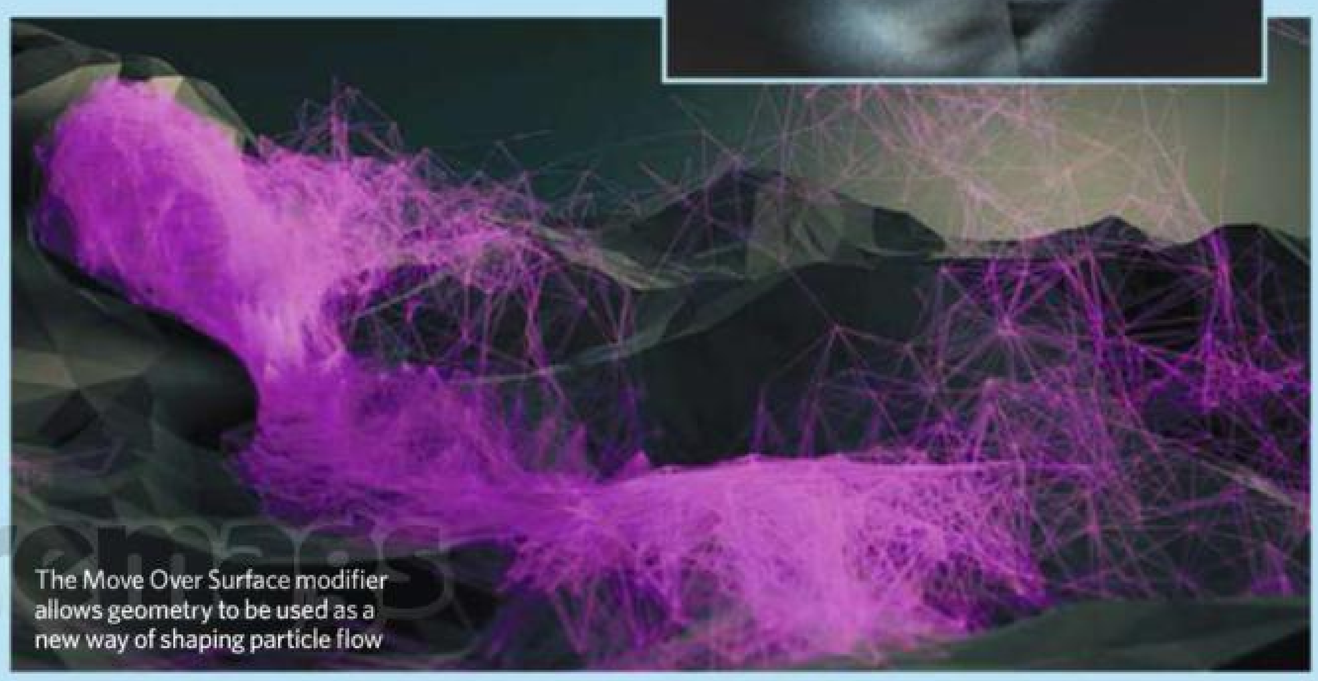
A new Move Over Surface modifier has now been added, making it easy to direct particles over surfaces in your scene. In practical terms this means that you can use geometry to shape the particle flow, rather than just as a collider. In addition, many of the modifiers now have an Over Life attribute, enabling you to use a function curve (spline GUI) to control the strength of a modifier over a particle's life. This is especially useful when using modifiers such as the Rotator, Gravity, or even Follow Spline.

Caching has also been significantly improved for this release. You can use cache tags to set up separate caches per object, or even use multiple cache tags on the same object to easily switch between cache objects in your scene. There are also advanced controls for the cache object, and the cache tags enable manual control over any playback.

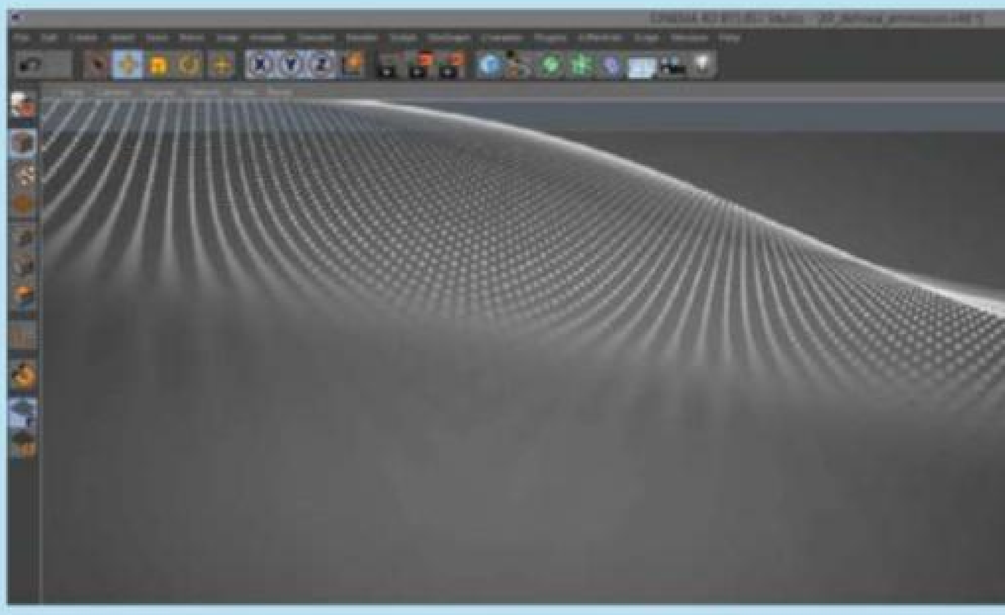
Rendering has also undergone heavy optimisation in the way the particles are sampled, enabling you to render millions of particles in seconds as opposed to the fairly substantial render times that could occur in previous releases. The High Quality attribute helps to ensure that each particle gets the sampling it needs, meaning less flicker, especially with smaller particles. For those looking for more, there is also Bridge, enabling you to render out X-Particles projects using Krakatoa.

There remains much we haven't mentioned, but overall this update provides huge leaps forward in development. It's a solid release that bodes well for the future.

This image shows the new texture-based emissions compared to the old threshold-based emissions. It also illustrates the massive improvements in rendering



The Move Over Surface modifier allows geometry to be used as a new way of shaping particle flow



Defined emissions make it easy to create patterns in space that can be controlled with MoGraph

Essential info

Price: £157/ $257 US
£340/ $393 US*
(Pro version)

www.x-particle.com

OPERATING SYSTEMS
- Mac OS X 10.6.8 or later (32- or 64-bit)
- Windows XP or later (32- or 64-bit)

OPTIMAL SYSTEM REQUIREMENTS
- CINEMA 4D R13 and later

The good & the bad

- ✓ Easy to get into
- ✓ Much faster rendering
- ✓ Excellent exchange and interoperability with other plug-ins and software
- ✓ New features to help organise hierarchies
- ✗ Some setups need to be re-worked slightly
- ✗ Scene organisation can be slightly cumbersome
- ✗ Node-based workflow is hampered by single-threaded Xpresso
- ✗ It can be difficult to achieve detailed fluid sims

Our verdict

Features	8/10
Ease of use	8/10
Quality of product	8/10
Value for money	9/10

"A robust and fast feature set, but complex sims can cause problems"

Final Score 8/10

* Price conversion correct at time of printing

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RMS 18 enables you to turn any geometric primitive into a highly realistic light source with Geometric Area Lights

RenderMan Studio 18

Pixar's well-known core-rendering technology is updated to support the RenderMan Pro Server 18 feature set

REVIEW BY Larissa Mori, 3D Artist magazine

For many of most prominent VFX and animation houses, Pixar's RenderMan has remained the ultimate solution for reliable, high-quality rendering – having been developed and first used in the 1980s.

Renowned for its quick and accurate handling of motion blur, fast displacements and ability to deal with heavy animated scenes consistently, PRMan has been a steady workhorse within the industry for so long that it is truly production-proven. This renderer is exceptionally reliable and robust, with a multitude of support available to users online.

However, the renderer also has a price high enough to dissuade some individual users and smaller companies from investing in it, and has developed a reputation for containing features that are difficult to master for those who aren't technically minded.

Enter the new RenderMan Studio 18, in which Pixar delivers a wide range of powerful features and tools for creating photorealistic CGI in one package, while at the same time streamlining workflows so that using RenderMan is now easier than ever before.

In essence, RenderMan Studio is a suite of applications that Pixar ships to provide a complete interface between Maya and its Pro Server Software, a renderer that has no front end for developing content. Version 18, which supports the feature set of RenderMan Pro Server 18 for significant performance gains, consists of RenderMan for Maya. This enables artists to gain RenderMan-quality renders without the need for much specific technical knowledge, as well as the shader-authoring and management tool Slim. Also included is the render viewer and scriptable compositor "it" and Pixar's RenderMan – an embedded renderer that enables users to preview scenes and render locally as a standalone seat.

In the past, one of the weaknesses found when using RenderMan for Maya was that it wasn't very fast with GI or as a ray tracer, at least compared with other products. Now RenderMan Studio supports Object Instancing through the normal Maya Instancing workflows for more efficient rendering of heavily ray-traced scenes. Other new features include the ability for artists to turn any geometric primitive into a realistic light source with a library of Geometric Area Lights and a new Lighting panel that provides easy control over the lights in any scene. The latter is useful when tweaking and re-rendering. There is also better subsurface scattering with the new Beam Diffusion Subsurface Scattering, to help eliminate the waxy look of CG human skin.

RMS 18 has also grown much faster than before. Depending on the scene, users can expect anywhere from four-times to ten-times overall memory reduction when rendering complex polygonal meshes. This ray-traces the complex meshes two- to three-times faster with displacement, or slightly less without any displacement.

Other tools within RenderMan Studio include LocalQueue for local render management and Tractor, a job-management solution for render farms

Essential info

Price: $1,300 US (approx. £796*)

http://renderman.pixar.com/view/renderman

OPERATING SYSTEMS

- Mac OS X 10.8 and 10.7 (64-bit)
- Windows 8, 7, and Vista (64-bit)
- Linux

TECHNICAL SPECIFICATIONS

- RenderMan Studio requires a valid version of Maya 2014, Maya 2013.5, or Maya 2013

A new lighting panel provides easy control over the lights in any scene, enabling users to modify multiple lights at once and create bookmarks

The good & the bad

- ✓ Production-proven renderer, extremely reliable
- ✓ High-quality final output for animated features and realistic motion blur
- ✓ A variety of different software tools from Pixar bundled into one
- ✓ Support includes forums, documentation, downloads and training materials
- ✗ More expensive than other rendering solutions
- ✗ Requires a valid version of Maya 2014, Maya 2013.5, or Maya 2013

Our verdict

Features	9/10
Ease of use	6/10
Quality of product	9/10
Value for money	7/10

> "Though pricey, RenderMan Studio 18 is the ultimate solution for high-quality rendering"

Final Score 8/10

* Price conversion correct at time of printing

Substance Designer 4

Rainer Duda puts Substance Designer 4 through its paces, testing Material Layering on a game asset

REVIEW BY Rainer Duda, freelance environment TD, Germany

As a user of Allegorithmic tools since the introduction of ProFX I'm an experienced user in the ways of the software. The latest release in the Allegorithmic line, Substance Designer Version 4, brings some new features to the table that are well worth considering.

First, Allegorithmic has implemented a new Multi Material Blend node, which is extremely useful as it enables shader networks to be created with far greater ease – especially for the Unreal Engine. This means you can quickly create great-looking and lightweight packages

With the new Multi Material Blend node, you can split an object into more than ten sections in just one mask by picking the corresponding tone on the colour mask inside Substance Designer 4. Each section can be used to create even more detail by mixing an infinite number of materials together.

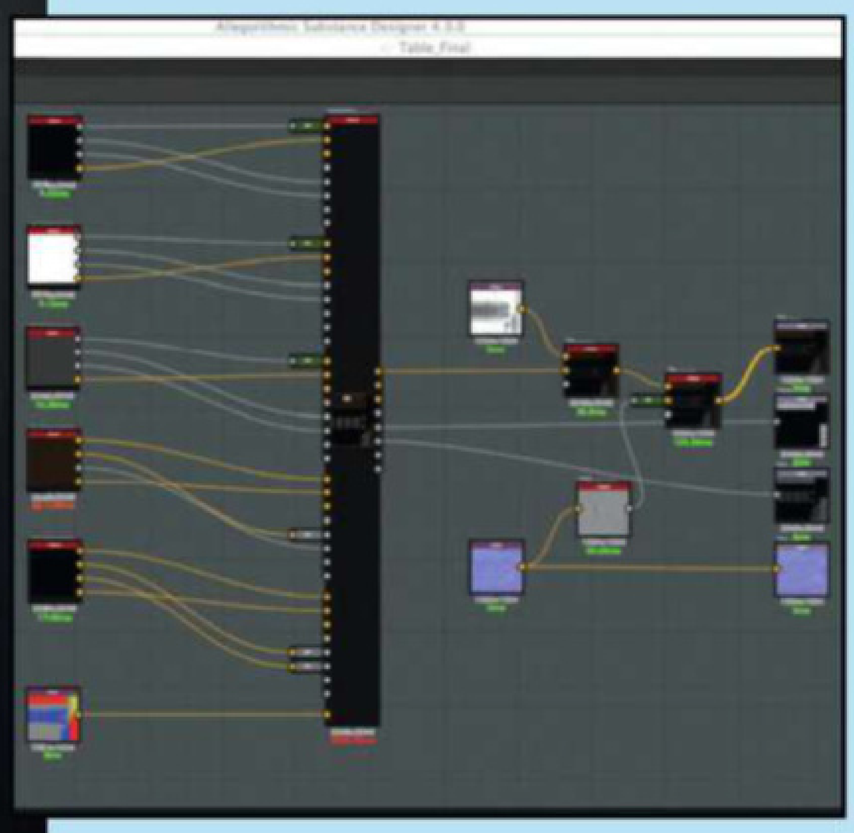
Basic materials are lightweight and can produce immense visual quality in combination with tiled Generator outputs

Another great feature helps artists generate faster and simpler maps. In game-development, for example, you have to work with Normal, Ambient Occlusion and Curvature maps. Substance Designer 4 now offers built-in tools to generate all the maps artists could need with ease. You can import your low-poly objects via drag-and-drop functionality and directly pick your high-poly mesh as the detail base. This can be used for the Normal or Ambient Occlusion baking process, which has been greatly improved in this latest version.

On top of this you can bake vertex colours, which are saved on your high-poly, to a Vertex Color map inside Substance Designer 4 as well. As such, artists no longer need to paint a Color map for the Multi Material Blend, but again just use the built-in tool to generate the Color mask.

To aid artists even further during their texture-creation process, Allegorithmic has added a PBR shader to Substance Designer 4. You can check your object at any time in the 3D viewport thanks to this newly integrated PBR shader, meaning that iteration and experimentation on your image is a far faster process.

Considering the non-linear, non-destructive material-layering, the PBR shaders, the extensive preset library and more, Substance Designer is overall more than a worthy addition to your game-development arsenal.



With the Multi Material node it's possible to combine an infinite number of materials using custom Blend nodes

Substance Designer 4 supports PBR rendering in the 3D viewport, which enables artists to work as close as possible to final image quality

Essential info

Price: $590 US (approx. £361*)
Non-commercial: $99 US (approx. £61*)
www.allegorithmic.com

OPERATING SYSTEMS
- Windows XP, Vista 7 (32 & 64 Bit) and 8
- Mac OS X 10.6 or Later

OPTIMAL SYSTEM REQUIREMENTS
- At least 2GB RAM but 4GB is recommended
- At least 512MB Video Memory – optimum is 1GB and higher
- Video card must be compatible with Shader Model 3.0

The good & the bad

- ✓ Accessible UI
- ✓ Rich set of nodes
- ✓ Map-generation tools
- ✓ Quick and easy-to-follow procedural workflow
- ✓ Added ability to export classic textures
- ✗ Just five software packages support Substance Designer 4 on a native basis

Our verdict

Features	8/10
Ease of use	8/10
Quality of product	9/10
Value for money	8/10

"Substance Designer 4 simplifies top-of-the-range texture-creation using a quick and simple workflow"

Final Score 8/10

* Price conversion correct at time of printing

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Inside guide to industry ne… …pert opinion and education

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> "Technology has matured to a point where we can give the director the freedom he needs to shoot the movie the way he wants"
>
> **Jamie Price** visual effects supervisor *RoboCop*. Page 104

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Alongside NUKE 8, HIERO 1.8 has also been made available to enhance the NUKE/HIERO workflow offering

Nuke 8.0 released

The Foundry launches NUKE 8.0 with a live streaming event hosted in London's West End

Software developer The Foundry has released the latest update to its powerful node-based compositor, NUKE, which was officially launched at a live streaming digital event hosted in London's West End.

The entire event is now available to watch online via The Foundry's official website (www.thefoundry.co.uk). Throughout the proceedings guest speakers from major facilities such as Framestore, Digital Domain and The Mill took to the stage to showcase their use of the new NUKE 8.0 features within television, commercial and various visual effects workflows.

New features include the Dope Sheet – which enables artists to see and move keys in the context of a Timeline view – and a new Text node, which gives artists the ability to create text directly in the viewer and then be able to edit, modify, or animate on a per-character basis. A new Pixel Analyzer samples multiple pixels from a specific channel layer, so users can clearly see live variants between images and elements when colour-correcting. There are also brand-new 3D tools such as the Edit Geo node that enables artists to modify the vertices or faces of native NUKE geometry, as well as any geometry read through a Read Geo node, including Alembic, OBJ and FBX.

Other updates include more artist-friendly colour controls such as an in-panel colour wheel to control hue, saturation and value. New Scope tools provide access to detailed levels of colour data on images displayed with Waveform, Vectorscope and Histogram viewers. Find out more about the release at www.thefoundry.co.uk/products/nuke-product-family/nuke/latest-version.

Sneak-peek videos, tutorials and teaser clips of the new features in NUKE 8 are also available to watch on The Foundry's official website, as well as the entire NUKE 8 Digital Event, where industry pros demonstrate how they use the new features

VFX Oscar nominations

The Academy of Motion Picture Arts and Sciences announces the finalists

Five contenders remain in the running for the Visual Effects category for the upcoming 86th annual Academy Awards.

After the Visual Effects Branch Executive committee had selected *Elysium*, *Gravity*, *The Hobbit: The Desolation of Smaug*, *Iron Man 3*, *The Lone Ranger*, *Oblivion*, *Star Trek: Into Darkness*, *Thor: The Dark World*, *Pacific Rim* and *World War Z* earlier last year, ten-minute excerpts from each of the shortlisted films were watched. Voting then took place to nominate just five of the films for final Oscar consideration.

The final nominees have been revealed as *Gravity*, *The Hobbit*, *Iron Man 3*, *The Lone Ranger* and *Star Trek: Into Darkness*. Alfonso Cuarón's *Gravity*, starring George Clooney, Sandra Bullock and some of the most impressive effects work to date, has also been selected as one of the nominees for Best Picture. *The Croods*, *Despicable Me 2*, *Ernest & Celestine*, *Frozen*, and *The Wind Rises* have all been nominated for Best Animated Feature.

Last year's ceremony proved controversial for many in the industry, as VFX artists went unmentioned by director Ang Lee, who won Best Director for the effects-heavy *Life of Pi*. The film won a total of four awards.

The Academy Awards for the outstanding film achievements of 2013 will be presented on Oscar Sunday, 2 March 2014.

Every exterior shot you see in *Gravity* is nearly entirely comprised of computer graphics – the actors' faces are one of the only real elements that you can see on the screen
© 2013 Warner Bros Entertainment INC

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● **HAVE YOU HEARD?** • Autodesk has added new cloud-based CAM 360 to its evolving product line

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VIEW Conference 2014

Italian CG event to be held from 14-17 October

It has recently been announced that the fifteenth edition of Italy's premier international event on computer graphics, interactive techniques, digital cinema, 3D animation, gaming and VFX will be held on 14-17 October 2014 at the Torino Incontra in Turin.

Submissions for the 2014 VIEW Award and VIEW Social contest, for short films employing animation or visual effects techniques, are now being accepted and conference organisers have also made a call for submissions of papers and workshops. The upcoming conference will be focusing on the topic of food, the environment and sports in movies and games, as well as the role of animation within education and media production for children and young adults.

VIEW Conference is the premiere international event in Italy on computer graphics, interactive techniques, digital cinema, 2D/3D animation, gaming and VFX

As with previous years, the core topics of the VIEW Conference are diverse, including games, VFX, augmented reality, digital media, interactive techniques, medical imaging, automotive and architecture design, simulating and synthesising reality, robots and robotics, reality capture, creative storytelling and mobile CG.

The colours of the past

Buddhist statue restored using CG technology

After two years of research, a joint team from the separate Tokyo Universities of Arts and Science has used CG technology to re-create the vibrant colours and patterns of an eighth-century statue.

The project to reproduce the original colours of the statue – an armour-plated guardian deity Shukongojin that visitors can only see once a year when on display to the public at Nara's Todaiji temple – was conducted by a team led by Satoshi Yabuuchi, professor of Studies in Preservation and Restoration of Sculptures at TUA Graduate School of Fine Arts.

3D printing with metal

An affordable new desktop 3D printer, named Newton 3D

Schunemann has already been named the joint winner of the Goldsmiths' Technological Innovation Award 2013 by the Craft and Design Council

3D printing on a desktop machine with metal as opposed to plastic has long been an aim of the industry, potentially enabling users to produce bespoke, precious and robust objects.

This is fast becoming a reality with a new desktop 3D printer from UK-based Newton 3D. Built from the research of Esteban Schunemann, PhD student at Brunel University in London, the Newton 3D printer uses metal clays such as bronze, sterling silver, copper and steel that are then fired. According to the company it will be released as an affordable 3D printer, developed for jewellers, as well as product, homeware and fashion designers.

Software shorts

Bringing you the lowdown on product updates and launches

Peregrine Labs ships Yeti 1.3

Peregrine Labs has released Yeti 1.3, the latest update to its node-based Maya Fur, Feathers and Leaves plug-in. New brushes for painting, clumping and twisting strands during grooming have been added, as well as support for subdivision surfaces based on Pixar's OpenSubDiv. There's also an updated user interface, making everything that little bit more accessible. Learn more at http://tinyurl.com/3DAYeti1-3.

Plant Factory Plant Library

E-on software has announced that Esri, the world's leading GIS company, has incorporated a new Plant Factory tree and shrub library as part of its recent CityEngine 2013 solution. Built using e-on's revolutionary Plant Factory technology, this library delivers exceptionally rich and realistic-looking 3D plants directly inside of CityEngine scenes. More information on CityEngine is available at www.esri.com/cityengine.

Amberlight

A procedural art tool capable of generating a range of effects, Amberlight, by developer Peter Blaškovič, is a standalone application that enables users to create images out of millions of particles flying through a canvas, via simple control circles and colour gradients. Amberlight is available to download from the Mac App Store at an introductory price of $20. To find out more, just visit http://tinyurl.com/Amber3D.

XMesh MY released

Thinkbox Software releases XMesh MY, a geometry-caching tool for Maya

XMesh MY supports Linux, OS X and Windows 64-bit operating systems and works with versions of Maya from 2011 through to 2014

Designed to streamline animation- and VFX-production pipelines, XMesh is a set of tools for saving animated scene geometry in a condensed format. This results in smaller files for faster loading, manipulation and sharing across facilities and applications. Also compatible with Autodesk's 3ds Max, the solution enables artists to quickly open, share or receive CG assets from internal studio departments or external facilities. "XMesh is the backbone of the interchanging pipeline between 3ds Max and Maya at Scanline VFX," explains Christian Deiss, pipeline TD.

DID YOU KNOW? • Google developer Christian Stefansen has coded a Chrome web app that emulates the Amiga 500

Project Focus

Reimagining RoboCop

We talk to the visual effects supervisor and producer of RoboCop about the surprising documentary influences that went into its realistic effects

Project *RoboCop*
Description In 2028 Detroit, Alex Murphy (Joel Kinnaman) – a loving husband, father and good cop – is critically injured in the line of duty. The multinational conglomerate OmniCorp sees its chance to create a part-man, part-robot police officer.
Website
www.robocop.com/site

Remaking one of the best-loved feature films of the Eighties was always going to be a daunting task, particularly when the film in question is 1987's *RoboCop*. Set in a crime-ridden future Detroit run entirely by one massive company, the movie sees a terminally wounded cop reconstructed as a cyborg in order for the company to win more favour with the public. It wasn't just the typical sci-fi blockbuster, but an R-rated, political satire full of extreme violence – a film seen by many at the time as a surprisingly intelligent commentary on contemporary American culture.

Despite the inevitable objections of disapproving fans that always come when attempting to re-create a classic, this modern-day *RoboCop* reincarnation does offer hope. The technological advancements in visual effects since 1987 have revolutionised the breadth of what can be achieved within any film, and while the budget of the original *RoboCop* was relatively tight – an estimated $13,000,000 – this year's feature has been estimated at $100,000,000. Of course, money isn't everything, but there's more to it than that.

For visual effects producer Gayle Busby, *RoboCop* will not just be a rehashed version of an old classic; it will in fact be a much different film to that which audiences may be expecting. "It's more of a reboot than a remake," she explains. "I can see places where the director, José [Padilha], has taken the style of a shot from the last film or he's taken the mood of a scene and created the modern version of it."

B

Interestingly, despite the fact that around 85 per cent of the movie contains some kind of visual effects, the CG in *RoboCop* will not necessarily be as evident as you might expect. "Some people will think *RoboCop* is going to be like *Iron Man* – very action-heavy and full of visual effects – but I think the visual effects are less apparent and much more based in reality, as if these things could really happen. Of course, there are plenty of visual effects, but to me they aren't the star. It's good that way."

Padilha's filmmaking background – which includes the tense and shocking Bus 174 – has played into this sense of realism. "José has got a documentary background and his shooting style is very much that of a documentary filmmaker," explains VFX supervisor Jamie Price. "He wanted to approach *RoboCop* in the most realistic way possible.

"Often in visual effects we rely on edits to help us out. We'll start a shot, then we'll cut and change something," continues Price. "José didn't want to do that, he really wanted to let his documentary style influence the feel of the movie and let the visual effects fit seamlessly within that atmosphere."

Contributors

Gayle Busby
Visual effects producer

Jamie Price
Visual effects supervisor

> "You know some people will think RoboCop is going to be like Iron Man… but I think the visual effects are less apparent and much more based in reality"
> **Gayle Busby,** visual effects producer

A

A RoboCop's appearance has undergone a great change since his first appearance back in 1987. Gone is the bulky, metallic cyborg, replaced instead by a sleeker, black version who – much to many a fan's disapproval – has his face exposed

B Busby explains that, for her, the visual effects of *RoboCop* are there to support the story as opposed to telling it. Effectively this highlights the character's journey and what it means for him to be turned into a cyborg, being part human, part machine

C "We had some mock-ups of costumes made where we could see the frame and get reference with how the light interacted with the surfaces. That was very useful for VFX for the lighting once they got the shots turned over," explains Busby

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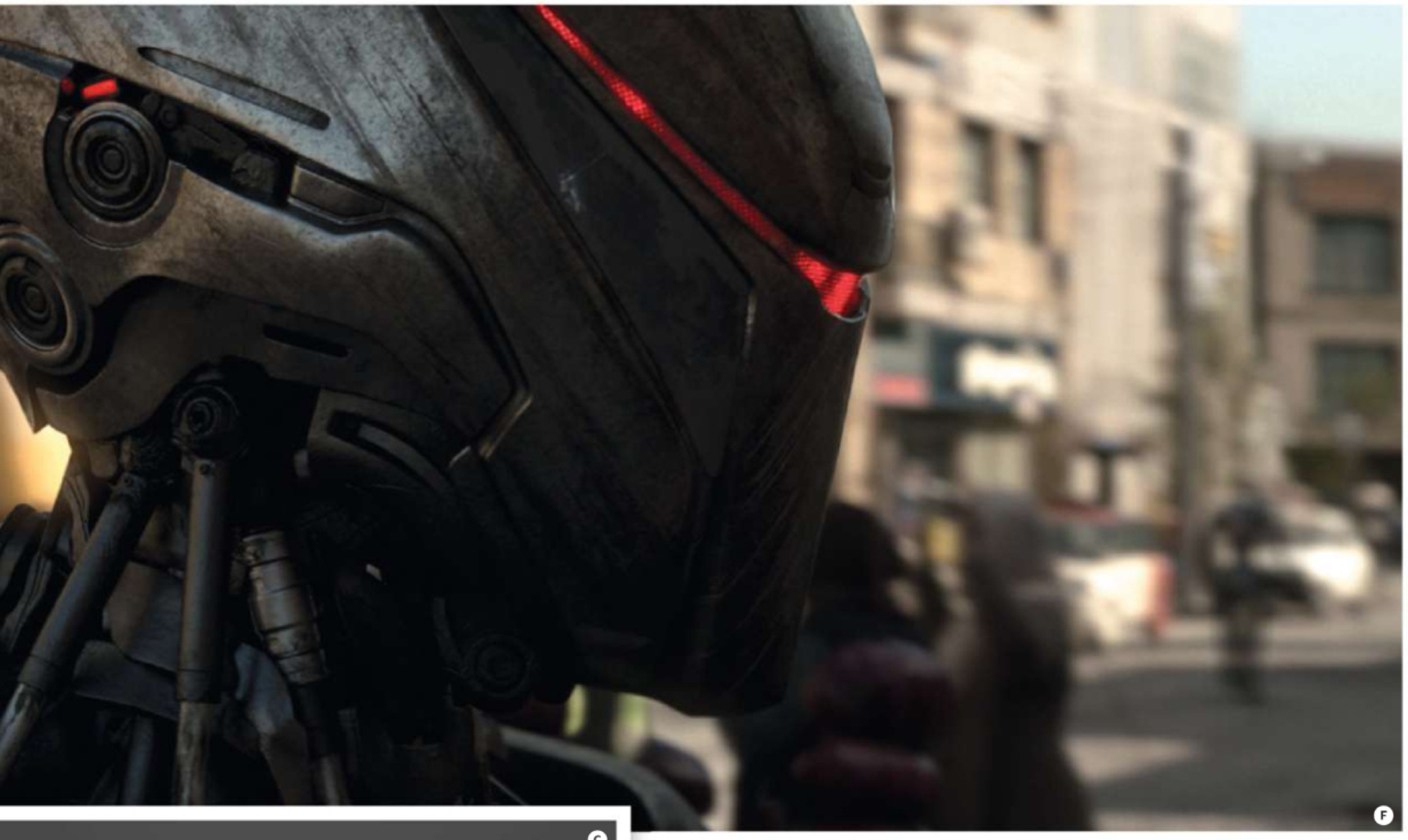

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Seamless CG to be proud of

According to visual effects supervisor Jamie Price, the audience won't be able to tell whether RoboCop is practical or CG in each shot

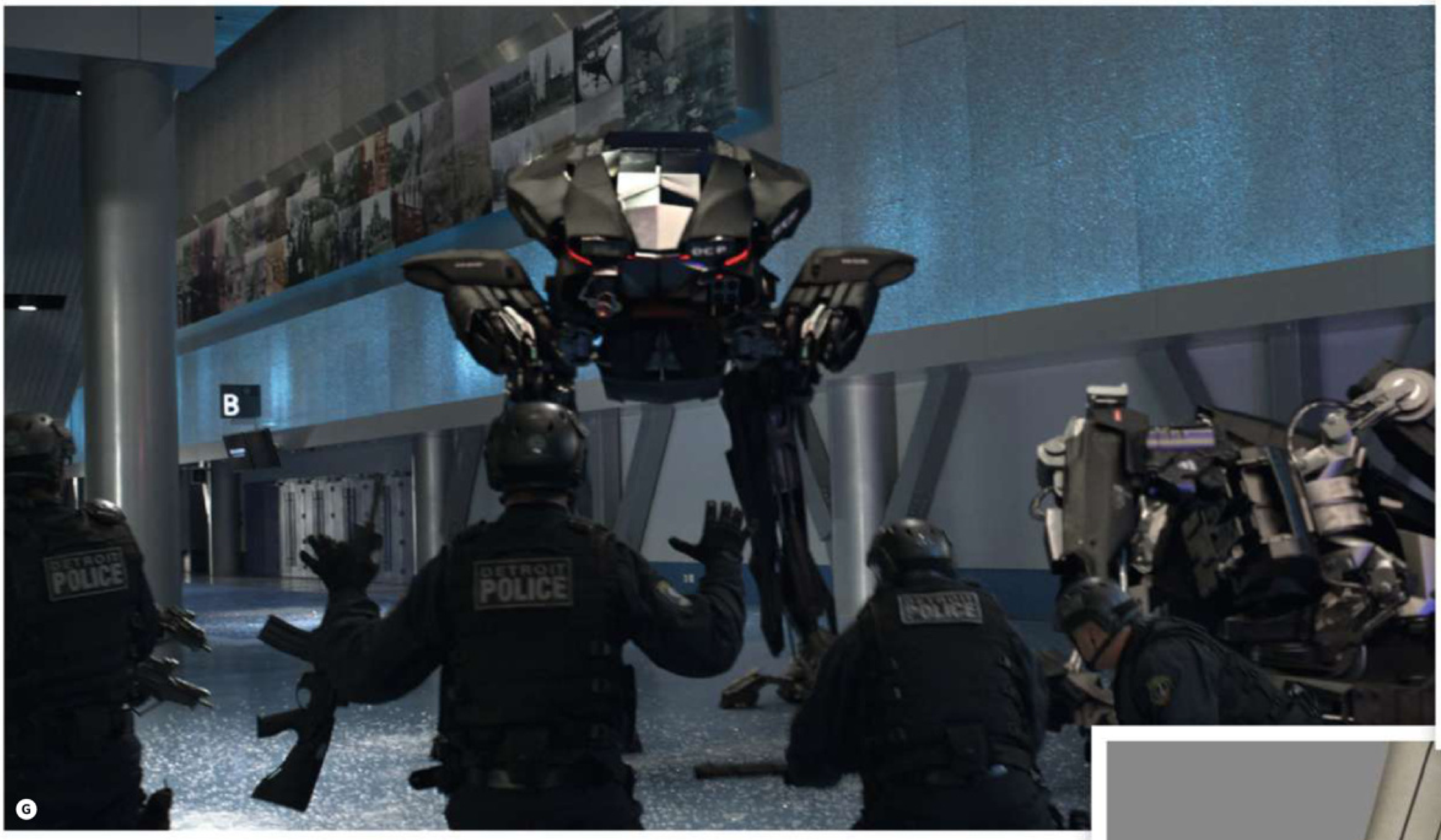
"I think the number one thing we're proud of is that the audience is not going to be able to tell when it's a practical RoboCop and when it's a CG RoboCop, so we're very pleased with that. I think the other main thing we're really proud of and we hope we've achieved in visual effects is just creating a seamless vision of the future – our future *RoboCop* is really just an extension of where we are today. It's subtle, but it's sprinkled throughout the film. That was another fun aspect of working on the visual effects throughout the movie."

In fact, even the futuristic environments of the film were carefully devised to give *RoboCop* more of a documentary feel. "The movie takes place in the future, but we try to take a very realistic and somewhat subtle approach to the way we approached visualising the setting," explains Price. "If you look out your window today you see buildings that are hundreds of years old and you see people wearing watches that are 50 years old, all alongside people carrying smartphones. In *RoboCop*, we would occasionally add an extra futuristic building or a special tablet that a lab worker is carrying, but we tried to make it a more a subtle and seamless extension of where we are today: more realistic, rather than an in-your-face kind of sci-fi style."

D The visual effects team put tracking markers all over a classical guitarist as he played, which Framestore then used to re-create mechanical versions of his arms as well as a photoreal guitar for one particularly memorable scene...

E "Once you put an actor inside a costume, the dimensions get a little thicker," says Busby. "You want to avoid it looking like a guy in a suit, so we knew we'd have to go in and digitally trim or replace the midsections where his proportions weren't right."

F In productions as big as RoboCop, perfection is a necessity. Director José Padilha became disenchanted with the creative choices of one company creating the graphics for RoboCop's brain chip, ultimately choosing to replace them altogether



A rather unpleasant surprise hit the film's production in September 2012, when the main visual effects vendor, which was initially going to be Digital Domain, went bankrupt. Six other competing vendors were then put to the test – taking a scanned model, a background plate and creating their own completely digital version of a shot. It was *Gravity* vendor Framestore that was ultimately chosen to take Digital Domain's place.

It was a partnership that worked both ways. The *RoboCop* production team wanted to carry out as much work in Canada as possible, due to the 30 per cent tax rebate available. Framestore saw the opportunity to finalise plans a new studio in Montreal, with the new facility's first job being *RoboCop*, alongside Framestore's London office.

"We ended up working with Framestore, and one of the things that they said early on, when we were thinking about the documentary style for the movie, was 'Well, we've got a whole team here that's working on *Gravity* with Alfonso Cuarón, so we're no stranger to long takes'," says Price. "So, everybody was aware that we might be doing things in a different style than what they were used to. We also knew we were going to be doing a CG RoboCop in a number of shots. That presented the challenge of making him look half human and half robotic, as well as showing his character arc through the movie as he goes through what he goes through – he starts as a human, he then wakes up a robot. His personality is taken away from him and he gradually works to bring it back, and that needed to be represented. It gave us an opportunity as visual effects artists to really work with performance and the physical qualities of the character. It was a lot of fun."

Of course, working with a director who didn't have a great deal of previous experience with VFX brought its own challenges. "When you work with a director that doesn't know visual effects, no matter how many times you say it's going to take a long time and it's all

Organic references

Visual effects producer Gayle Busby explains how Framestore went above and beyond when finding reference videos for its effects work

"Framestore went so far as to get a set of pig lungs, because during one part of the film we see the lungs moving inside of a body. They inflated and deflated them, and we shot it on video so that we could see what real lungs look like if they weren't in a body, expanding and contracting. There were also a lot of videos of real brains belonging to people that were freshly dead, as well as brains of people that were alive but their cranium was removed, all in the name of achieving reality. You know people really did their research!"

G "We love the Special Effects department – we work hand in hand with them," says VFX supervisor Price. "In *RoboCop*'s case a lot of the practical effects were related to gun battles or shoot-outs. There are a lot of large-scale physical effects"

H Smaller company Mr. X was given an entire sequence of digital enhancement work for *RoboCop*. This included adding elements such as CG shots of RoboCop, bullets hitting the character and environment elements breaking apart around him

I

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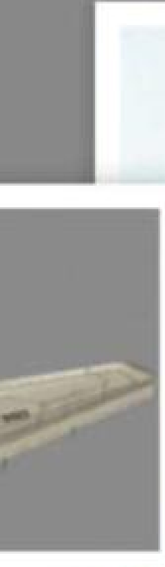
very expensive, it just doesn't sink in until you get to the middle of post-production," explains Busby. "I think he thought that visual effects should be faster. They think it should take a couple of days when in fact it takes four weeks." Despite this, the visual effects were eventually integrated seamlessly into José Padilha's cinéma vérité style, making for a unique and eye-catching experience. "The technology has matured to a point where we can really give the director the freedom that he needs to shoot the movie the way he wants, so that's very satisfying as a visual effects supervisor – to be able to support the director's vision so completely," explains Price.

"Framestore did a really awesome job with it," Busby adds. "There's this scene in the movie where RoboCop sort of disassembles himself – he wants to see what's left of his body. That's a really spectacular scene that's also very hard to watch. This is a PG13 movie, so we don't have the violence of 1987's *RoboCop*, but to me it felt like this was the emotional equivalent to that without all the gore.

"That's really the aim – to have it be like you're stepping into the future and you're seeing these really top-secret things, yet it's so based in reality it's not going to take people away to fantasy land," she concludes. "It's not supposed to."

J



K

> "The technology has matured to a point where we can really give the director the freedom that he needs"
>
> **Jamie Price,** visual effects supervisor

I Every physical set for the film had to be scanned to create 3D models, which would be used to track every location where RoboCop would be. The visual effects artists could then use these scans to track the digital portions back onto the real actor

J Though he had little previous experience with CG work, director José Padilha aimed to make sure the visual effects for *RoboCop* were beautifully integrated with his documentary-influenced shooting style. CG is now at a point where this is viable

K Shots were being turned to vendors as early as a month before the film finished shooting. They then began aiming for a hero look for each environment and character, while managing expectations for what was possible with each sequence

Storemags

Studio Access

Ingenuity Engine

How a one-man startup evolved into a successful full-service post facility

ingenuity ENGINE

Ingenuity is an artist-owned, full-service post facility based in Hollywood. The crew combines art and technology to enhance storytelling.

www.ievfx.com

Country USA

Software used 3ds Max, NUKE, Smoke, Photoshop, V-Ray, Maxwell, Alembic, ZBrush, MARI, Syntheyes, Fume, Forest Pack, RayFire, Ornatrix, SpeedTree

One of the fundamental beliefs upon which the team at Ingenuity Engine bases its work is that VFX isn't just about greenscreens. "There's a saying in production: good, cheap, fast – pick two," says creative director Grant Miller. "Our work is distinctive because we push ourselves to pick all three."

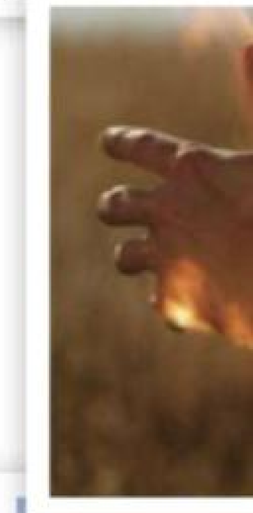
It all started in 2004, when founder of Ingenuity Engine David Lebensfeld realised that as software and hardware in the industry were becoming universally available, affordable and powerful, his dream of opening a studio suddenly become not only financially viable, but it could also be a physically small and manageable startup.

First run from an apartment in Santa Monica, the studio's small beginnings enabled Lebensfeld to build its foundations on talent, as opposed to expensive equipment and real estate. This enabled the studio to quickly gain enough recognition to move into a small six-metre-square cubical inside Hollywood-based production company DNA.

There, the Ingenuity Engine team began to work on projects both independently and for DNA and a handful of other production companies. Soon, the studio had once again outgrew its space. "Growing at and in DNA was amazing. It was a very familial atmosphere," remembers executive producer Matthew Poliquin. "Leaving was terrifying! We were quite literally leaving our entire client base."

Yet the move to a new studio proved to be worth the risk. The Ingenuity Engine team were soon overloaded with a new client base, as production companies that wouldn't or couldn't come into a DNA's office – a competitor – were suddenly showing up at the new location. "Our clients were nomads, moving from company to company, spreading the good word of Ingenuity. Those directors and producers moved on and bore even more clients," Poliquin continues.

A



"The static workforce enables us to place more focus on our projects as opposed to staffing and management," Miller explains. Although most of the permanent artists who now work at Ingenuity Engine were initially specialised in their respective departments, they displayed a willingness to broaden their own skillsets, something that the studio looks for in its staff. "While they each have their own niche, at their core everyone is a generalist," continues Miller, telling us that this fluidity enables the studio to be able to create great results within the typical two- to three-week deadlines that come with working primarily in the commercial industry. "We have animators that can light and shade their own work then do the required roto and compositing to put a shot together. We find that this approach really increases ownership and subsequently the quality of the work."

This flexible workflow is further enforced by a company emphasis on encouraging constant learning, with training provided for all staff. "We have a Digital Tutors account, FXPHD and more," says Miller. "We are always learning new tools and trying new techniques.

> "We've invested a lot of time in bridging the gaps that we know first-hand other studios experience"
>
> **Grant Miller,** creative director

Contributors

Grant Miller
Creative director

David Lebensfeld
Founder, creative director

Matthew Poliquin
Executive producer

Portfolio highlights

Here are some of the big-budget projects Ingenuity Engine has worked on:

2009-Present *Parks and Recreation on NBC*
2013 *HTC One Blinkfeed – No Digging Necessary*
2013 *Virgin Holidays – Unleash Your Mojo*
2013 *Truth – Flavor Monsters*
2013 *Jello – Pudding Surprise*
2012 *Katy Perry – Wide Awake*
2012 *Callaway – RAZR Rit Drivers / Bellagio*
2012 *Pepto Bismol, Pepto to Go – The Power of Pepto Now In Your Pocket*
2011 *Nascar on Fox – He's a Fan*
2011 *Old Navy – Super C.U.T.E*
2011 *A Very Harold and Kumar 3D Christmas*

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Realistic or stylised?

Matthew Poliquin describes the pros and cons of producing both realistic and stylised work as Ingenuity Engine looks to make more of the latter

"A motion graphic this or cartoony that is abstract. It looks the way it looks and there's no right or wrong. It never looks fake. However, that sort of creative latitude also comes with a great deal of free rein in our clients' feedback: 'It's not quite what we had in mind.' 'No, we don't think that's what colour the music would be right now...' You quickly discover that everyone has a different opinion of what an abstract cartoon bird looks like. The photoreal work generally operates in an inverse universe. There's less room for interpretation in what a CG car looks like, so the real vs. not real question is binary: yes or no. Getting from no to yes is the challenge in photoreal work – pulling work out of the Uncanny Valley and into reality."

We encourage employees to ask for help and pick up new software. We feel that if our artists aren't pushing their boundaries, they're falling behind."

The studio also employs internal developers with a focus on creating proprietary software for the pipeline, such as Weaver, a node-based scene-assembly tool that facilitates multiple artists working on a single shot at once. Poliquin explains that this is all part of the in-house tools the studio is now looking to take to market. "We've invested a lot of time in bridging the gaps in workflow and technology that we know from first-hand that other studios experience. We thought 'why not try to monetise that?'"

This is one of several ways Ingenuity Engine is looking to keep to maintain its long-standing tradition of fast expansion in the future. "We're making a push to do more stylised work, putting emphasis and support on our design, graphics and branding," continues Poliquin. "We've observed and heard second-hand that in certain markets there are unfulfilled needs for innovative, high-end VFX work. It's these areas that we want to expand into, bringing our brand and mindset to work for clients abroad, tapping into their local markets." Poliquin emphasises this is about international work directly catered to its culture and environment: "This is *not* about chasing tax incentives or taking advantage of cheap labour just to work on domestic projects for studios. It's insane to think about going halfway around the world to work on a project for a studio that's a mile away from our LA office."

Another exciting expansion plan is to take a more holistic approach to VFX. "The idea of a post-production company always seemed a little weird to us," says studio founder Lebensfeld. "Sure, we are the last ones to touch an image after it has been shot, but our involvement isn't exclusive to working on footage and shipping. Over the past 15 years the lines have blurred. VFX artists are now in a unique position to really see what works and doesn't work once our fix-it pencils are down. We're excited to exploit those lessons."

A "Our first paycheck came from a music video we did for the band The Early November on Drive-Thru Records. This was before the DNA days," remembers David Lebensfeld

B Grant Miller tells us he's most proud of the work Ingenuity Engine created for *A Very Harold and Kumar 3D Christmas*, which was the team's first big studio feature and first project in stereo 3D

C Despite the increasing demand for fast turnarounds tempting more and more studios to simplify, the Ingenuity Engine staff believe simple is not always the most efficient way of telling a story

D During pre-production the team at Ingenuity Engine look through reference and pull out subtleties, such as volumetric light in a large stadium or caustics from a pool's shimmering reflections

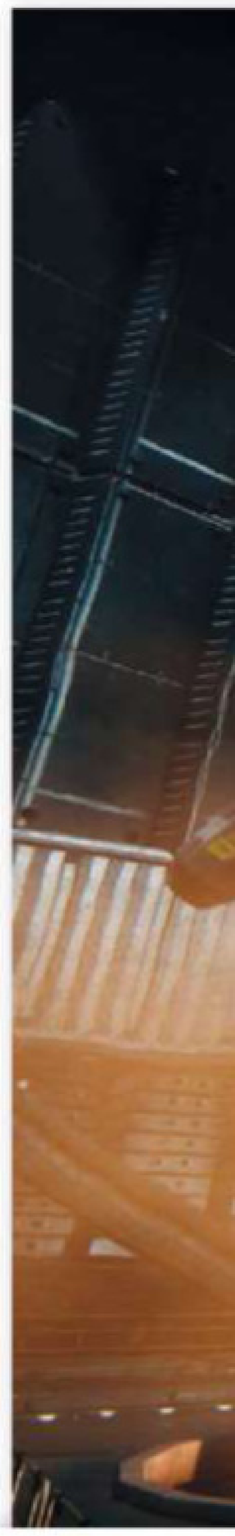
E "The Uncanny Valley is reserved for humans, but the principal applies to synthesising anything photoreal. The last ten per cent of a shot is generally applying the imperfections," says Matthew Poliquin

Industry insider

Patrick Gladys

Environment artist

Environment artist Patrick Gladys gives us an insider's look into working on Crysis 3 and Ryse: Son of Rome at Crytek



About the insider

Job Environment artist
Country Germany
Education Advanced Vocational Diploma in Graphic Design & Game Art Certificate
Website www.zenpat.cghub.com
Biography Aiming to work in the games industry, Patrick Gladys left school to attend a vocational school for graphic design and communication in 2007. He then received a scholarship for an academy in Frankfurt offering a game art course. In September 2012 he started as an intern at Crytek working on *Crysis 3*

Originally from Cologne, Germany, environment artist Patrick Gladys has been aspiring to work in the games industry for years. At only 17, he decided to leave school to attend a vocational school for graphic design and communication. The foundation saw him get lucky, winning a scholarship to study game art at an academy in Frankfurt, where industry experts such as senior artists at Crytek would be his new teachers. Little did he know that only a few years later those same artists would be both training him and working alongside him while he worked as an intern on *Crysis 3*.

"A lot of artists struggle to break up something they have built or worked on for some time, and honestly it didn't feel good for me to throw things away when I started out either," says Gladys, who has now worked on both Crytek's *Crysis 3* and Xbox One launch title *Ryse: Son of Rome*. "However, I was a total beginner who worked with the pros, so I didn't question the things my seniors suggested. Ultimately, it was totally worth it, as the more often I retouched things and reworked them, the more the unpleasant feeling faded away. It really frees you up mentally and you tend to try out a lot more variants of one thing until you end up with the best possible solution."

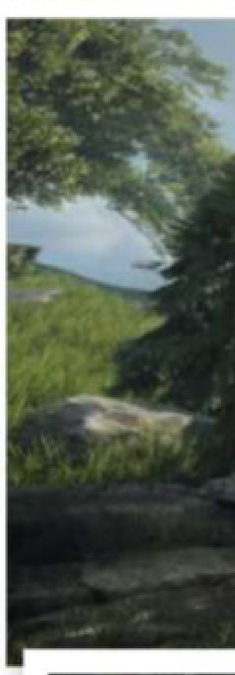
What aspects of creating 3D games environments excites you most?
Crysis 3 is a pretty good example of what I like to do most. *Crysis 3* is realistic – a game with great detail and an amazing atmosphere to it – but the concept was not only to create a realistic-looking game, it was more about taking two settings that stand in really strong contrast to each other and integrating one into the other. In this case it was jungles, canyons and deserts being combined with a huge urban city like New York. Through that mixture the team created a very unusual world, something a human would probably never see in their entire life.

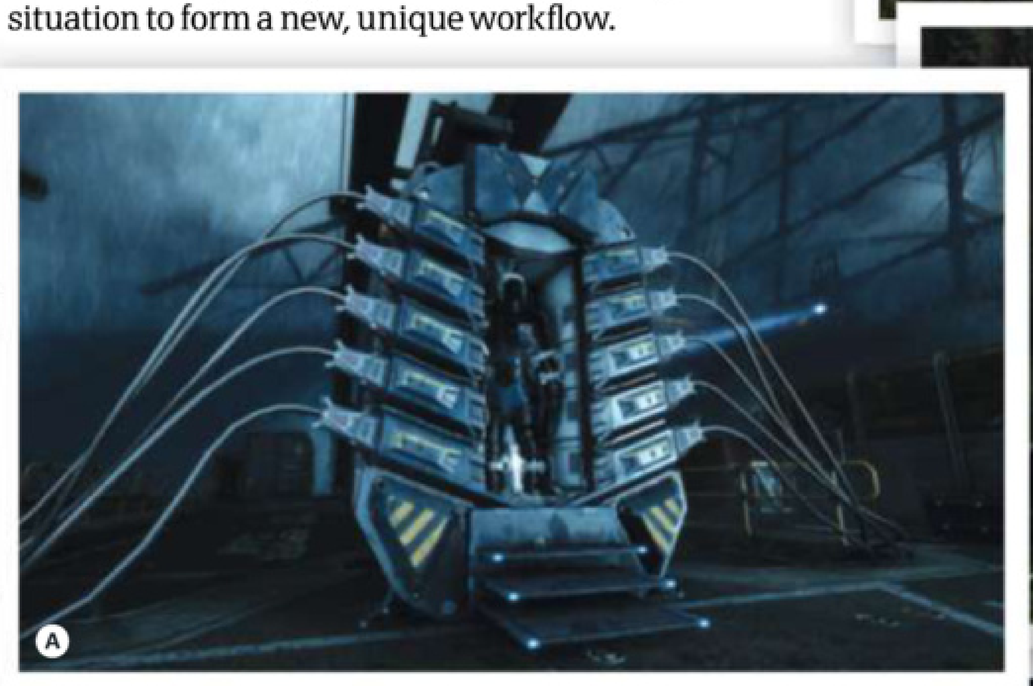
That is what excites me most when it comes to 3D art, because it enables me to create anything I can imagine without any exceptions. It's especially exciting as millions of players around the world can enjoy playing in the environments that you put so much energy into.

What are your main aims for how the environments in the game will look? How do you go about achieving that on a daily basis at Crytek?
It's not really about how the environments would look, but rather what kind of atmosphere the level should express to players. Our art lead, Jason Hickey, told me one thing when I started to work on *Ryse* that I found very useful: "When I look at your materials, I immediately want to know what they would feel like when I touch them."

Every week the environment art team was meeting up to go through and review everyone's WIPs, making it possible for each individual in our team to receive feedback from everyone else – often those meetings would evolve into interesting discussions and people would start sharing awesome ideas. Getting constant feedback like that will prevent you from getting to the point where you don't really know how to move forward with your piece, or improve it further.

Can you please discuss your workflow and how you go about creating your work?
There is one thing I believe when it comes to workflows and that is there is no single universal workflow you can create everything with; it's way more dynamic than that. In production, you want to create your assets quickly and easily to save time. If you choose to create art in the same way over and over, you might end up taking too long. Before I start to work on an object, I take a few minutes and try to think about all the software I know, as well as the technology that exists and all the beneficial tools that will save me time. I then try to combine everything I think is useful for that particular situation to form a new, unique workflow.





Portfolio highlights

Some recent features that Patrick Gladys has worked on:

2013 *Crysis 3*
2013 *Ryse: Son of Rome*

Image credits:
Level design William Josephy
Environment art Liam Cullen, Tom Deerberg, Patrick Gladys
Lighting Christopher Campbell
VFX Caleb Essex, Fábio Marques Da Silva

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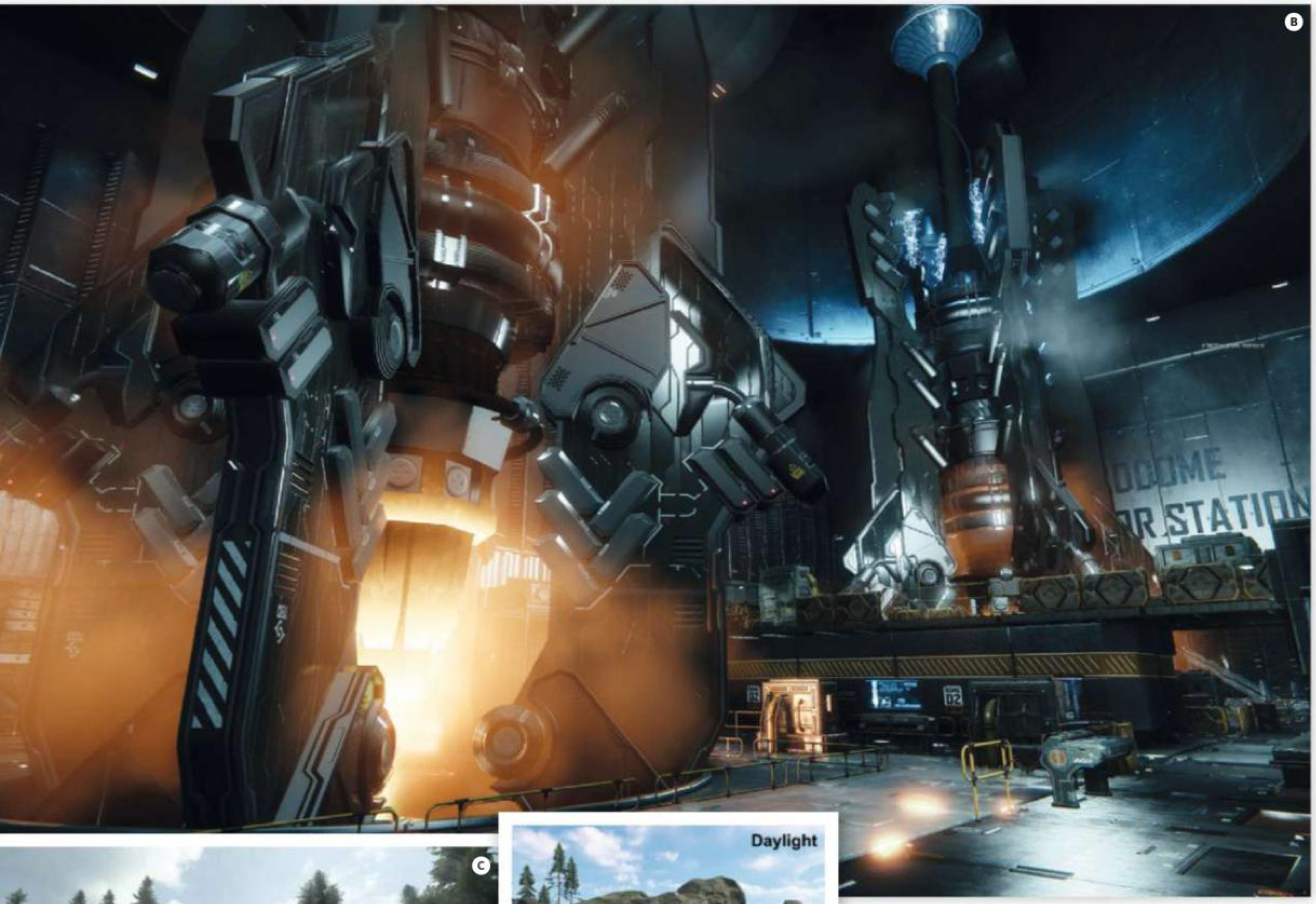

Tools of the trade

Gladys describes the main tools he regularly uses to create and render videogame environments and assets

"ZBrush is definitely the software I use to create organic objects due to its great sculpting tools, such as DynaMesh or ZRemesher. Of course, CryEngine, our extremely powerful game engine, is the place where everything comes together. That's where the scene is built up and where the very last art passes take place."

> "It's not really about how the environments would look, but rather what kind of atmosphere the level should express to players"

A "For *Crysis 3* I enjoyed creating some hard-surface assets, such as the cage that the nanosuit is locked up in during the very first cinematic," Gladys tells us

B *Crysis 3* was the first title that Gladys worked on for Crytek, when he was still an intern at the studio. The game's last gen visuals remain hugely impressive

C "*Ryse* felt like a collaborative thing, so there was influence from all directions, but we also had great freedom creating those levels," Gladys explains

D Gladys created solid environment pieces such as stones and cliffs in *Ryse*, as well as the vegetation, which he was personally trained in the production of by Tom Deerberg

E After creating textures and applying them to his objects in CryEngine, Gladys toggles through the light settings to ensure the objects look realistic

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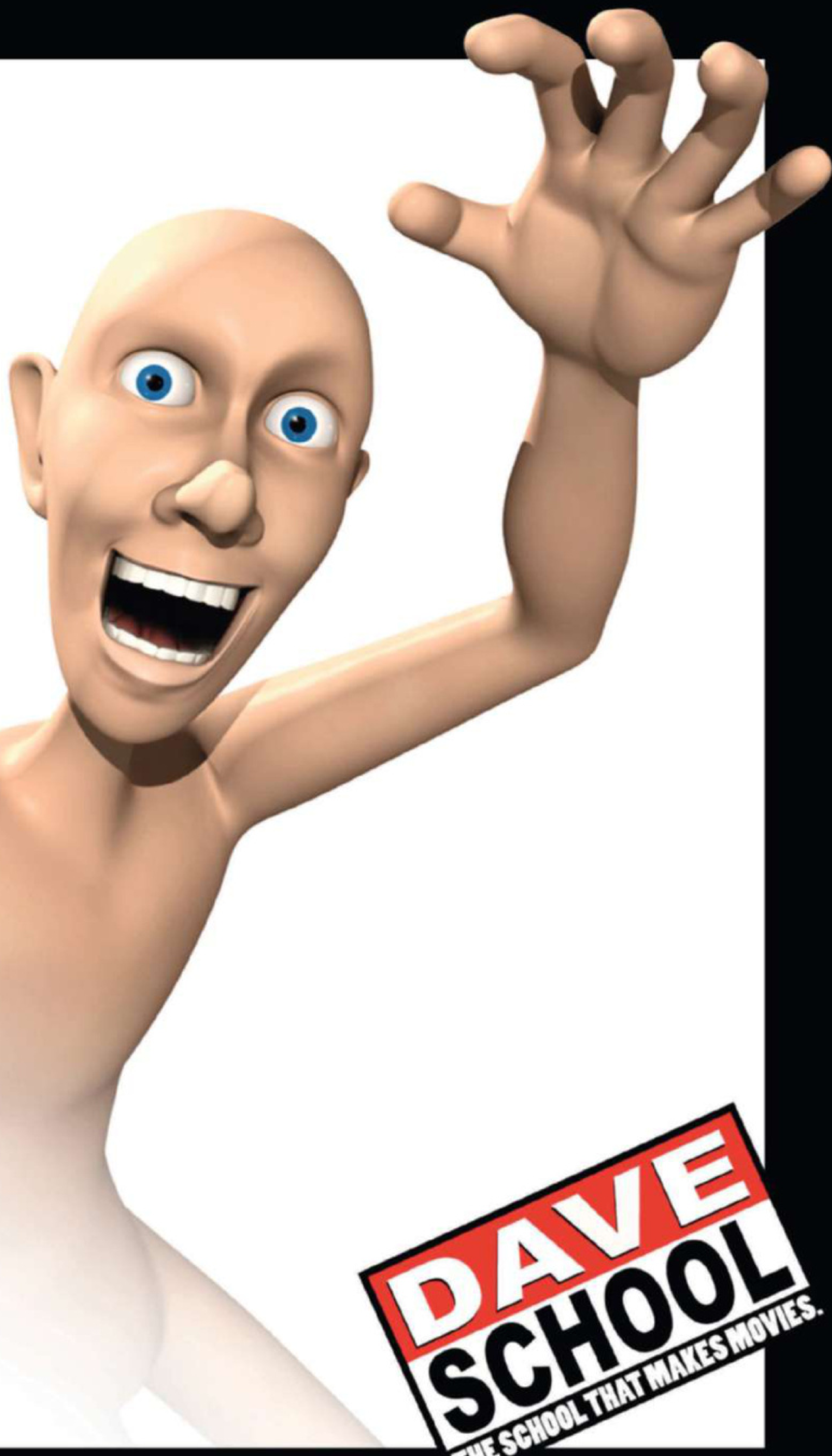

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